SECOND REPORT

OF

THE COMMISSIONERS

APPOINTED TO CONSIDER AND RECOMMEND

A

GENERAL SYSTEM

OF

RAILWAYS

FOR

IRELAND.

Presented to both Houses of Parliament by Command of Her Majesty.

DUBLIN:
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1838.

COMMISSION.

VICTORIA, by the Grace of God, of the United Kingdom of Great Britain and Ireland, Queen, Defender of the Faith, &c.

To Our trusty and well-beloved *Thomas Drummond*, Esquire, Under Secretary of State in that part of Our United Kingdom of Great Britain and Ireland called Ireland; *John Fox Burgoyne*, Esquire, Colonel in Our Army; *Peter Barlow*, Esquire, Professor of Mathematics in Our Royal Military Academy at Woolwich; and *Richard Griffith*, Esquire, Greeting. WHEREAS his late Majesty, King William the Fourth, did, by his Letters Patent, bearing date the Twentieth day of October in the Seventh Year of his Reign, appoint you, the said *Thomas Drummond, John Fox Burgoyne, Peter Barlow*, and *Richard Griffith*, to be his Commissioners for considering and reporting upon the principal Lines of Communication in Ireland, with reference to the comparative advantages and facilities they will afford for the construction of Railways. Now, know ye, that We have revoked and determined, and by these Presents, do revoke and determine the said recited Letters Patent, and every clause, article, and thing therein contained. And further, know ye, that We, reposing great trust and confidence in your zeal and ability, and being graciously pleased to renew the said Commission, and to continue you in such Employment, have authorised and appointed, and do by these Presents authorise and appoint you, the said *Thomas Drummond, John Fox Burgoyne, Peter Barlow*, and *Richard Griffith*, or any two or more of you, to be Our Commissioners for the purposes aforesaid. And Our Will and Pleasure is, that you should consider, *First*, as to a general System for Railways in Ireland, in such manner, either by causing Surveys to be made of the Leading Lines, or otherwise, as may best tend to guide the Legislature in the consideration of the projects that may be brought before it. *Secondly*, as to the best mode of directing the development of said new and important means of intercourse to the channels whereby the greatest advantages may be obtained by the smallest outlay, taking into consideration not only the existing means which the country presents, but those which may be anticipated from the resources which may in future be developed. *Thirdly*, that you should make Inquiry as to the Port or Ports on the West or South Coast of Ireland, from whence the Navigation to America may be best carried on by Steam or Sailing Vessels; and that you should investigate particularly the Facilities for the construction of Lines of Railroad across Ireland, to such Port or Ports in connexion with the greatest possible collateral benefits to internal communication. And, *Fourthly*, that you should inquire into all such other matters as may appear to You essential to the useful prosecution and result of your investigations. And for the purpose of enabling you, Our said Commissioners, to form a sound judgment on the premises, We do hereby authorise and empower you, or any two or more of you, to obtain information thereupon, by the examina-

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tion of all persons whom you may judge most competent, by reason of their situation, knowledge, or experience, to afford it; and also, by calling for all documents, papers and returns, which may appear to you, or any two or more of you, calculated to assist your researches. And We do also give and grant unto you, or any two or more of you, full Power and Authority, when the same shall appear to be requisite, to administer an oath or oaths to any person or persons whatsoever to be examined before you, or any two or more of you, touching or concerning the premises. And We do hereby command and require you, or any three of you, to report to us in writing, under your hands and seals, on or before the 31st day of March next, or sooner, if the same can reasonably be, your several proceedings, by virtue of this Our Commission, together with your Opinion on the several matters which you are hereby required to take into your consideration. And We will and command that this Our Commission shall continue in full force and virtue, and that you, Our said Commissioners, or any two or more of you, may from time to time proceed in the execution thereof, and of every matter and thing therein contained, although the same be not continued from time to time by adjournment. And We hereby command all and singular Our Justices of the Peace, Sheriffs, Mayors, Bailiffs, Constables, Officers, Ministers, and all other Our loving subjects whatsoever, as well within liberties as without, that they be assistant to you and each of you in the execution of these Presents. And further, We do hereby appoint Our trusty and well-beloved *Harry David Jones*, Esquire, Major in Our Army, to be Secretary to this Our Commission, whose service and assistance We require you to use from time to time, as occasion may require. In Witness whereof, We have caused these Our Letters to be made Patent.

Witness Ourself at Westminster, the 4th day of November, in the First Year of Our Reign.

By Writ of Privy Seal,

(Signed) EDMUNDS.

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SECOND REPORT.

TO THE QUEEN'S MOST EXCELLENT MAJESTY,

&c., &c., &c.

We, the undersigned Commissioners, appointed by his late Majesty, under Letters Patent, bearing date the 20th day of October, 1836, to inquire into the manner in which Railway Communications can be most advantageously promoted in Ireland, and reappointed by your Majesty, under date the 4th day of November, 1837, humbly beg to submit to your Majesty this our Second and Final Report.

INTRODUCTION.

It will be seen, by a reference to our former Report, presented on the 11th of March, 1837, that we had, at that time, collected much information, and were still prosecuting a variety of inquiries bearing on the subject submitted to our consideration;—that we had employed two eminent Civil Engineers to examine and survey the country along certain lines, the general direction of which we indicated to them, and to report on the facilities or difficulties which these lines presented to the construction of Railways;—that various returns and documents showing the state of the country, in relation to the value and amount of its commercial transactions, the extent and activity of the existing intercourse, and the comparative importance of different districts, were in preparation for our use—some by public departments, some by public companies, or private individuals engaged in extensive business, and others, under the immediate direction of the Commissioners.

It will be perceived that we were also engaged in inquiring into the principles which should be observed in the construction of Railways; and, in order to ascertain and estimate these by their practical application, that we were in communication with the chief Railway Companies of England. Professor Barlow and Major Jones subsequently visited the works of these Companies, the better to inform themselves, by minute personal examination, of whatever facts or improvements recent experience might have established or introduced.

From these various sources we have received a mass of valuable and interesting information, which we shall now endeavour to classify and digest, so as to exhibit its bearing on the object of our investigation, and its influence on the conclusion at which we have arrived. It affords us much satisfaction to state, that, with very few exceptions, the most liberal disposition has been evinced by individuals, whether in public or private stations, to promote the object of our inquiries: and we are particularly indebted to several Directors and Managers of Railway Companies, who have materially aided us by the frank and unreserved communication of the results of their own experience and reflection, as well as by the careful consideration they bestowed, and the useful information they imparted to us, on several important points to which we requested their attention. We have also to express our acknowledgments to M. Mongey, *Ingénieur des Ponts et Chaussées*, and to M. Le Grand, the Director-General of that Department, for several interesting documents relating to Railways projected in France.

We regret that the valuable Map to which we alluded in our First Report, as having been prepared for our use by Lieutenant Larcom, of the Royal Engineers, does not accompany this Report: it is now, and has been for a considerable time, in the hands of the engravers, but its execution required more time than was expected; and partly from this cause, partly from a desire to improve the delineation of the features of the country, by sketches taken on the spot, a greater delay has occurred in preparing it for publication than we were led at first to anticipate. We regret this the more, because, to those who are not personally acquainted with the ground over which it is proposed that the lines of Railway shall pass, the direction which they take, must in some places, appear unintelligible, without the aid of a Map exhibiting, with tolerable precision, the principal physical features of the country; and, further, because we are hereby deprived of an opportunity of representing the geological structure of the country, on a Map of such size and accuracy as a work full of important details necessarily requires. We have endeavoured to supply, for the present, the deficiency of the first by a manuscript copy of this Map, which may be referred to by those who take an interest in the subject; and, as a temporary substitute for the second, Mr. Griffith has delineated the most remarkable geological characters on a smaller Map, which has been prepared for publication as well as the time and other circumstances would permit.

In submitting this Report we are sensible that a longer period has elapsed since the date of our First Report than the public had reason to expect.

The delay is attributable to various causes. Much of the information essential to our inquiries was not obtained till long after the promised periods; and more time and labour were required in the preparation of many of the documents which accompany this Report than had been anticipated; but the delay is mainly to be ascribed to the greater extent to which our inquiries have been carried, and the alterations which, in consequence, became necessary in our proceedings: new and more enlarged views were developed—the field opened as we advanced; and we were thus induced, in some instances, to revise and repeat, and in others to extend our observations.

We may also remark, that the engraving of the various Maps and Plans has, notwithstanding every exertion, occupied a much longer time than was expected, nor is it yet altogether concluded; so that, even if our Report had been sooner presented, it must have gone before the public unaccompanied by the documents essential to its elucidation. We felt the full responsibility attached to recommendations, which, if received and acted upon, must cause a large expenditure, and eventually prove either highly beneficial, or, nearly in the same degree, detrimental to the community. It was, therefore, our constant endeavour, and the object of our most diligent and anxious consideration, to arrive at sound conclusions, and establish them by proofs and arguments, upon which the country might rely; and, although the time necessarily devoted to this purpose has far exceeded what we originally contemplated, it will not, we are persuaded, be deemed to have been uselessly protracted, in the investigation of subjects so considerable in themselves, and involving consequences of the greatest moment.

We have obtained results which appear to us to show clearly—what may be expected from the establishment of Railways in Ireland—to what extent, and in what directions it may be judicious to attempt them,—and how far and in what manner it may be safe to promote or encourage them as public works. As our Report will necessarily extend to some length, and will embrace several distinct heads of inquiry, we shall here briefly explain the arrangement which we have adopted in treating the important subject submitted to our consideration.

We have, in the first place, endeavoured to present a general statistical view of Ireland—exhibiting the manner in which the population is distributed and employed,—the exports and imports of the country,—the amount of the present traffic, and through what channels it is carried on,—the number of public conveyances throughout Ireland, and the average number of passengers on every road;—the amount of postage received in the different towns, and at different periods;—the number of Banks established in different towns, and the dates of their establishment. From the information thus supplied, the relative importance of different districts, and the commercial activity prevailing therein, may, we apprehend, be with tolerable accuracy deduced. Our next inquiry has been into the nature and fertility of the soil; the productiveness of the different districts; the capabilities of improvement which they possess; and the facilities which they afford for Railway communications. The geological structure of the country throws great light on these questions, and we have accordingly entered briefly into the consideration of the most important points, particularly those which bear upon our subject and lead to useful practical results; but in addition, Mr. Griffith has supplied us with a condensed Outline of the Geology of Ireland, which we have introduced in the Appendix No. 1.

We may mention, in illustration of the value and practical bearing of such an inquiry on the subject under consideration, that certain geological formations present, in this country, almost invariably, rich and fertile soils, readily worked, and a surface capable of being traversed with facility. They furnish abundant means to the Agriculturist for the improvement of the land, and to the Engineer for the execution of his Works; while other formations present, usually, a rugged country of much inferior fertility, difficult to be traversed, and affording only obdurate and unmanageable materials for construction.

With a view of placing, as it were, before the eye a picture of the country, representing the distribution of its population and its traffic, whether of goods or passengers, illustrative Maps, on a new design, have been prepared, of which the construction shall be explained in treating of the subjects to which they relate.

We conceive that the statistical information which we have collected, and the estimates which we have given, confirm the opinion adverted to in our First Report,—that the important public objects anticipated from the establishment of Railways in Ireland, are not to be accomplished by separate and isolated lines, but by a well combined and judicious system, in which the joint traffic of many places and districts should pass, to a great extent, over one common line.

We then proceed, in reference to this principle, to consider the various circumstances above detailed, and to describe the general direction of the Main Trunk Lines, which these considerations clearly indicate as capable of affording the greatest accommodation at the least outlay, and as being the best adapted to stimulate the industry and develop the resources of the country.

Next in order follows the result of the survey and examination of the country in these directions, made by the Engineers employed by the Commissioners, and we then proceed to describe the lines laid out according to our instructions.

This constitutes the first part of our Report.

The full and detailed Reports of the Engineers—Messrs. Vignoles and Macneill—the former on the lines which traverse the South and South-Western Districts; the latter on the lines of the North and North-Western Districts, will be found in the Appendix A. Engraved plans and sections of these lines accompany this Report.

The Second Part of our Report is devoted to the examination of the important question—What would be the probable return on the capital required for the execution of all or any of these Lines?

If our conclusions are just, the Lines that have been selected are those which would, in the aggregate, give the greatest return on capital. But whether such return, though greater than could be expected on any other lines in Ireland, would afford an adequate remuneration to the capitalists who may embark in these undertakings, becomes the next subject for our consideration.

To ascertain this extremely important point, we enter, in some detail, into the economy of Railroads, and apply the results thus obtained to the data furnished by special enumeration, and by estimates framed on certain hypotheses with regard to the population, produce, and consumption of the districts traversed by the proposed lines.

The Third Part of our Report is occupied in the consideration of those circumstances peculiar to the situation of Ireland, and to the condition of its inhabitants, which would render the promotion of such works as we recommend, an object not only of local but of national importance; and in connexion with this branch of our inquiry, the means by which it might be necessary or advisable to give effect to that object, are stated and enforced.

Looking to the geographical position of Ireland—our attention has been directed to a question which is at present exciting much interest—the practicability of a steam communication between Great Britain or Ireland and

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America;* and with respect to the condition of the Irish people—we submit some facts and observations on the influence of Railways in developing the resources of a country, and thereby improving the physical and moral state of its inhabitants.

We conclude this part of our Report by respectfully submitting certain recommendations as to the mode in which public aid might, in our opinion, be most effectually and economically given; and we have added some suggestions as to a general control of Railway Companies, which every day's experience will, we are satisfied, prove to be absolutely necessary as a protection to the public interests.

In the First Part of our Report we state the grounds of selection, and describe the Lines selected:

In the Second, we discuss the return which may be expected on the capital required to construct and work them: and

In the Third, we inquire, whether public aid should be given to promote the execution of all or any of these works; and, if given, in what manner, to what extent, and under what conditions.

In the Appendix will be found several interesting papers intimately connected with the subject under consideration, viz.:—

I. Outline of the Geology of Ireland, prepared by Mr. Griffith.

II. Suggestions on the powers to be given to Railway Companies.

III. Report by Lieutenant Harness, of the Royal Engineers, explanatory of the mode in which the Traffic, Passenger, and Population Maps have been constructed; and giving the data and reasoning on which are founded the estimates of the amount of produce which would be carried on the different lines of Railway—estimates which have been tested and confirmed at the most important places by actual enumeration. As these subjects will be again noticed under the heads to which they severally belong, we shall, for the present, merely observe, that it contains ingenious views, and has supplied deficiencies in our very imperfect statistical returns, which we could not by other means have replaced or filled up.

Appendix A contains the Reports of Mr. Vignoles and Mr. Macneill, to which we have already alluded, and notwithstanding the short time necessarily allowed for the examination and survey of so great an extent of ground, these Reports are worthy of the reputation of those eminent Engineers. Mr. Vignoles had to contend against the great embarrassment arising from very imperfect maps; for the Ordnance Survey has not yet extended to the districts which he examined. Mr. Macneill had the assistance, which he has most fully acknowledged, of that valuable Work; but in his case it was the more needed, because the lines he was directed to examine pass through a country, which, in some parts, presents very considerable difficulties to the Engineer. These Reports will be perused with satisfaction by all who take an interest in the establishment of Railways in Ireland.

There is also a valuable paper by Mr. Stanley, who, at the request of the Commissioners, undertook a variety of inquiries into the trade of certain districts, and had personal communications with the most extensive dealers residing therein.

The Appendix contains a Statement by Mr. Vignoles of the manner in which he considers a Railway communication through Dublin can be effected, and also a Report of his survey of a line of Railway through North Wales, undertaken with a view to a rapid steam communication between London and Dublin. This is an interesting Report on a very important subject, and will be read with attention.

We have also given numerous Statistical Returns, and several communications, all of which bear more or less on the subject under consideration, and to which we shall have occasion, in the course of our Report, more particularly to allude.

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* When we commenced our Inquiry, an opinion adverse to the success of such an enterprise was entertained by many; we therefore went fully into the subject; that part of the Report which relates to it was in the Press before the recent voyages were undertaken. The question may now be considered as decided experimentally, but we have thought it best to leave the article as originally printed.

PART I.

INQUIRY INTO THE VARIOUS CIRCUMSTANCES TO BE CONSIDERED IN DETERMINING A GENERAL SYSTEM OF RAILWAYS FOR IRELAND.

PART I.

1. AMOUNT, DISTRIBUTION, AND EMPLOYMENT OF THE POPULATION.

Amount of the Population.—The population of Ireland was, in the year

1731, - - - - -	2,010,221
1791, - - - - -	4,206,602
1821, - - - - -	6,801,827
1831, - - - - -	7,767,401
1834, - - - - -	7,943,960

Estimating the increase going on for each of these periods, we find it during the first period of 60 years, to be at the rate of 1¾ per cent. per annum: during the next period of 30 years, 1⅗ per cent. per annum: during the next 10 years, 1⅓ per cent. per annum; and for the last period, only ¾ths per cent. per annum. But this interval is, perhaps, too short for a very exact result. Taking for our guide the rate of increase between 1821 and 1831, the population at the present time, 1838, would amount to 8,523,750. The population of England, Wales, and Scotland, computed in the same manner, from the census of 1821 and 1831, would amount at present, to 18,226,725; whence it appears that the population of Ireland is at this time within 600,000 of being equal to one-third of the population of the United Kingdom.

Distribution of the Population.—To give a distinct view of the manner in which this immense mass of people is distributed over the surface of the country, a Map has been prepared, which indicates, by various degrees of shade, the relative densities of the population, the figures denoting the number of inhabitants, per square mile, within the respective baronies. A glance at this Map will show that the population is most crowded and numerous in the counties of Armagh, Monaghan, and in part of the counties of Antrim and Down.

Atlas, Map No. 2.

Diminishing in density, but still furnishing a large proportion to the square mile, the population extends over the counties of Longford, Westmeath, King's, Queen's, Kilkenny, Carlow, and Wexford; and thence a large mass, second only to the northern portion, spreads over the southern counties of Tipperary, Limerick, and parts of Cork and Waterford.

Beyond the Shannon lies a district very thickly peopled; and the parts of Roscommon, Leitrim, &c., adjacent to the river, have nearly the same proportion of inhabitants.

These four divisions of the population differ in social condition, in habits, character, and even in personal appearance, more than the narrow limits of their location within the same country, would lead us to expect. The northern portion are better lodged, clothed, and fed than the others: the wages of labour are higher, being, on an average, about one shilling per day; and their food consists chiefly of meal, potatoes, and milk. They are a frugal, industrious, and intelligent race, inhabiting a district for the most part inferior in natural fertility to the southern portion of Ireland, but cultivating it better, and paying higher rents in proportion to the quality of the land, notwithstanding the higher rate of wages.

In the southern districts we find a population whose condition is, in every respect, inferior to that of the northern; their habitations are worse; their food inferior, consisting at best of potatoes and milk, without meal: the wages of labour are found reduced from one shilling to eightpence per day; yet the peasantry are a robust, active, and athletic race, capable of great exertion; often exposed to great privations; ignorant, but eager for instruction; and readily trained, under judicious management, to habits of order and steady industry.

The population of the midland districts does not differ materially in condition from those of the south; but the inhabitants of the western district are decidedly inferior to both, in condition and appearance: their food consists of the potato alone, without meal, and in most cases without milk; their cabins are wretched hovels; their beds straw; the wages of labor are reduced to the lowest point, upon an average not more than sixpence per day. Poverty and misery have deprived them of all energy: labour brings no adequate return, and every motive to exertion is destroyed. Agriculture is in the rudest and lowest state. The substantial farmer, employing laborers, and cultivating his land according to the improved modes of modern husbandry, is rarely to be found amongst them. The country is covered with small occupiers, and swarms with an indigent and wretched population. It is true, that some landed proprietors have made great exertions to introduce a better system of agriculture, and to improve the condition of their immediate tenants, and a few of the lesser proprietors have made humble attempts to imitate them; but the great mass of the population exhibits a state of poverty bordering on destitution.

The distinctions we have drawn as to the usual diet of agricultural labourers in the different parts of Ireland, are strictly applicable to those only who have regular employment. When they are out of work, which is the case in many places, during three or four months of the year, the line is not so easily perceived. Then a reduction in the quantity as well as in the quality of their food takes place; but still, though on a diminished scale, their relative local degrees of comfort or of penury are maintained nearly according to the above classification. In no extremity of privation or distress, have the peasantry of the northern counties approached to a level with those of the west, whilst Leinster and the greater part of the south, though sometimes reduced to the lowest condition, retain, generally, even in the most calamitous periods, a shade of superiority. There are districts, indeed, in every quarter of the land, where, through peculiarities of situation, or other causes, distress falls with an equal pressure upon all; but such exceptions are rare, and so limited in extent, as scarcely to qualify the foregoing observations.

We may here observe, that in proportion as wages fall below a fair standard of compensation, the work received in return will be dear. This striking and interesting fact, sufficiently attested by experience as a general truth, has been confirmed to us, with regard to the districts of which we are now speaking, by the authority of a practical engineer, who has had most extensive professional experience in every quarter of Ireland.

No vigilance of superintendence can be an effective substitute for the motive which adequate remuneration supplies; and, for want of such a stimulus, a sauntering, dilatory, apathetic mode of working becomes, in progress of time, the confirmed habit of the district; an evil for which an increase of wages will not prove an immediate remedy.

Looking then to the numbers, condition, and habits of the people within the four great divisions which we have described, and to their relative capabilities of benefitting by a new and improved system of communication, we cannot have any hesitation in expressing our opinion, that the first efforts should be directed towards carrying lines of Railway from Dublin through the northern and southern districts. We conceive that the population of the western district are not in a condition to avail themselves, to the same extent, of the advantages to be derived from works of this description; but that greater good would be effected among them by opening and promoting the construction of common roads, of which, in some districts, they are at present greatly in want.

Such would be the course which a reference to the distribution and condition of the population, apart from any other considerations would prescribe; we shall presently find that the relative amount of traffic, number of passengers, and other circumstances, &c., confirm that view,—more particularly define the direction which the lines should follow,—and show their respective usefulness and importance.

Employment of the Population.—With respect to the employment of the people—it is essentially agricultural; but in the northern district, besides their rural occupations, numbers of the peasantry are engaged in the linen trade.

The culture of flax, its preparation and manufacture, occupy a considerable portion of the time and labour of the population of the counties of Armagh, Antrim, Down, Tyrone, Londonderry, and part of Monaghan.

If agriculture were more perfect in these districts, the farms larger, and the distinction between the farmer and the labourer more marked, such a combination of trades would probably be found neither convenient nor conducive to profit; but the farmers being also, for the most part, labourers, and the labourers small landholders, the spare time not required for the cultivation of their land, and which, in other districts, is so often given up to idleness, intemperance, or crime, is here devoted to a profitable and useful employment, which rewards industry with a fair return, and promotes habits of peace and order. The variety of occupation afforded by this system of domestic manufacture, to the different members of the family, is its chief recommendation. While the men are engaged in weaving the yarn, the task of preparing it for the loom by breaking, hackling, and spinning, is performed by the females, who find such a mode of industry congenial to the habits of their sex, and compatible with their household duties.

The number of weavers who manufacture on their own account is diminishing; but as the power-loom has not yet been so extensively applied to the manufacture of the linen, as machinery is to the spinning of the yarn, the hand-loom weaver is still enabled to stand his ground.

There are in Belfast and its immediate vicinity fifteen mills for the spinning of linen yarn; and four at places not far distant. The largest of these mills employs 800 persons, and its annual consumption of flax amounts to 720 tons. According to the Returns of the Seal Officers and Inspectors of the late Linen Board, the value of unbleached linen, sold in the several counties of Ulster, during the years 1821, 1822, 1823, 1824, was as follows:—

	1821.	1822.	1823.	1824.
Antrim, - - - - - -	£345,504	£332,496	£351,912	£323,767
Armagh, - - - - - -	570,348	608,842	557,341	568,799
Down, - - - - - -	214,199	204,828	197,943	238,514
Tyrone, - - - - - -	388,809	397,657	381,090	434,898
Londonderry, - - - -	231,219	286,810	225,496	252,614
Donegal, - - - - - -	33,076	38,954	35,966	20,432
Fermanagh, - - - - -	23,386	24,027	16,535	21,259
Monaghan, - - - - -	142,952	134,485	112,330	125,959
Cavan, - - - - - -	116,626	99,429	89,564	123,063
Total, Ulster, - - -	£2,066,119	£2,127,528	£1,968,177	£2,109,305
Total, Ireland, - - -	£2,538,001	£2,677,335	£2,411,861	£2,580,697

	Acres.
Number of Acres sown in Flax, in the Province of Ulster, in the year 1823, - -	80,936
Ditto ditto, in the whole of Ireland, in the year 1823, - -	122,242

We regret that no authentic information showing the state of the linen trade can be obtained subsequent to the year 1824, when the Linen Board was discontinued; but the Returns by the Collectors of Customs indicate a large increase of the quantity of linen exported in 1835, as compared with the exports of 1825: and Mr. Stanley reports, on the authority of the most experienced persons concerned in the trade at Belfast, that the manufacturing of linen throughout Ulster has increased within the last five years.

The only town in Ireland, in which the cotton trade has been established to any extent, is Belfast; and it is represented as declining even there. Several of the mills originally designed for the spinning of cotton are now employed in spinning flax, and there are at present only six cotton mills in Belfast.

With regard to the woollen trade, a considerable diminution appears to have taken place since 1822. A statement of its extent and value at that period is to be found in the Appendix to the Fourth Report of the Parliamentary Commissioners, who were then engaged in an inquiry on the state of the Revenue in Ireland. We have reason to believe that the estimate therein given, both as to the quantity and value of the woollens stated to be then manufactured, is too high.* There existed at that time forty-five manufacturers in and about Dublin, and the value of the cloth annually produced by them, if estimated at the present prices, would probably be about £200,000. The value

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* See Letter from Mr. W. Willans, the proprietor of the Hibernian Mills, near Dublin, and the most extensive woollen manufacturer in Ireland—Appendix A. No. 8, p. 75.

PART I.

of the woollens now manufactured within the same district is stated by Mr. W. Willans, to be about £90,000. The manufacture has also declined in the districts of Cork, Kilkenny, Moate, and Carrick-on-Suir; and at the present time, the value of the woollens produced within all these districts is supposed not to amount to £20,000.

With regard to the flannel trade of Wicklow and Wexford, the annual value of its produce is estimated, in the document above referred to, at £56,000. This was probably much above its actual value at that time, but it may now be considered as extinct.

One branch of the woollen trade, the manufacture of worsted and stuff articles, has greatly increased since 1822, and is now carried on to a considerable extent at Mountmellick and Abbeyleix.

With respect to the wool grown in Ireland, its annual value, at the present prices, may amount to £300,000. The great bulk is exported to England, and a part to France. Irish wool is not suitable for the manufacture of any cloths but those of very low price, but it is well adapted to any article of worsted manufacture, and hence one of the principal causes of the recent extension of that branch of the woollen trade. The consumption of woollens in Ireland is much below that of an equal population in England. Mr. Willans calculates that the annual value of the woollens sold in Ireland does not exceed £1,400,000, being about 3*s.* 3*d.* per head on the population; whereas the total consumption of England cannot be less in value than from £18,000,000 to £20,000,000, which would amount to 20*s.* per head.

The great proportion of the woollens consumed in Ireland being of English manufacture, the fine cloths of Dublin are beginning to find a market in the south of England. Among the many and striking effects of steam navigation are the changes which it is effecting in the commercial relations of different parts of the country. While many districts of Ireland are brought, for the purposes of trade, nearer to England and Scotland than to Dublin, a more immediate and less expensive communication is established between that city and many important parts of England than now exists between it and the counties of Mayo, Sligo, Donegal, and Derry. The manufacturer of Dublin can now send his goods to Devonshire, Cornwall, Dorsetshire, and Somersetshire with more despatch than the manufacturer of Yorkshire.

Upon the whole, the woollen trade of Ireland, though much less than what it formerly was, is now in a sounder and healthier state than when existing under the paralyzing influence of protecting duties. The manufacturers, though few in number, carry on their business with activity and intelligence; they have adopted every new improvement in machinery, and they have generally an abundant supply of water and water power. The wages which they pay are less than those paid for similar work in England;[*] and Liverpool and London, the great marts for foreign wool, dyes, and oil, are fully as accessible to the Irish as to the English manufacturer; they are, in consequence, able to produce an article capable of sustaining competition with the best specimens of Yorkshire cloth.

"On these grounds," observes Mr. Willans, "I look forward with confidence to the yearly advance of the woollen trade of Ireland."

Besides these, it can scarcely be said that there is any other manufacture in Ireland conducted on so great a scale as to be of much national importance. Under the now exploded system of bounties and protecting duties, several manufactories sprang up; but not being the natural growth of circumstances favorable to their establishment, most of them gradually disappeared as soon as the undue encouragement, which had created and stimulated them, was withdrawn. Still there are to be found, in every district, establishments of various kinds, conducted in the most creditable manner; but they do not exist to such an extent as to claim especial notice

[*] The following valuable testimony to the conduct and qualities of Irish workmen is given by the head of a highly respectable firm in Leeds :—"We employ in our factory nearly 300 Irish workmen. I have had a great number of them in my employment from two to twenty years, some twenty-four and twenty-five years; we like them, as workmen, fully as well as the English: they are as orderly as any, and we think their habits much improved."—*Extract of a Letter to the Secretary of the Railway Commission, from Mr. Obadiah Willans, of Leeds.*

in a general view of the employment of the people. If it were necessary to show that there is no inaptitude among the population for manufactures, for such even as require the greatest ingenuity, neatness, and skill, we would select the Damask of Lisburn and the Tabinets of Dublin: the worked Muslins produced in many parts of Ireland, and very often from the poorest cabins, rival those of France, and are sold at half the price; embroidery on Silks and Satins is also carried to great perfection, and Schools have been established in many places for the instruction of the female peasantry in this beautiful art.

But while the manufactures which were formed under the system of bounties have been sinking into decay, the various processes to which agricultural produce is subjected have been gradually extended and improved. Grinding, malting, brewing, and distilling have made great progress within these few years. Until lately, the mills of Bristol and Liverpool enjoyed almost the exclusive advantage of converting the Irish wheat into flour. That process is now performed in Ireland. The construction of water-wheels, and other machinery, has been much improved, and the use of them, under favorable circumstances, has greatly increased; but there are few large mills in which steam is not united with water power, in order that the supply may be constant and regular during the summer as well as the winter months—a proof of a better system of trading and of more enlarged means.

The process of malting was one of the first in which improvement became manifest; and this has gradually led to greater perfection in the quality of the beer produced. Great breweries have been established in Dublin and Cork. Irish porter is now largely exported to England, and the Dublin bottled porter successfully rivals the London porter, even in London itself.

The quality of Irish produce has also considerably improved: Irish butter, Irish pork, and Irish beef bring greater prices in the English market, than they did some few years ago; while the quantity produced and exported has much increased. The districts in which these improvements are the most manifest, are those of Cork, Waterford, Limerick, and Belfast.

From north to south indications of progressive improvement are every where visible; and most so in places which are accessible to the immediate influence of steam navigation; but these signs of growing prosperity are unhappily, not so discernible in the condition of the laboring people, as in the amount of the produce of their labour. The proportion of the latter reserved for their use is too small to be consistent with a healthy state of society. The pressure of a superabundant and excessive population (at least, with respect to the resources as yet developed for their maintenance and occupation,) is perpetually and powerfully acting to depress them.

2. NATURE AND AMOUNT OF THE PRESENT TRAFFIC; IN WHAT MANNER, AND THROUGH WHAT CHANNELS CARRIED ON.

We have had great difficulty in obtaining any information which could be depended on, with respect to this important subject. Though the value of statistical information is now generally understood and admitted, no steps have as yet been taken in this country, towards collecting it to the extent, or with the precision, commensurate to its great importance.

The data which such returns furnish, constitute, in many cases, the only sound foundation for legislation. They frequently develop relations which it greatly imports the well-being of society to have clearly ascertained and established, and they furnish the most important aid, as well as point out the safest course in removing impediments to national prosperity, and in promoting judicious improvement. Yet, notwithstanding these advantages, which cannot be disputed, the statistical returns of Great Britain and Ireland, except when relating to revenue, are lamentably defective. And whenever a public inquiry becomes necessary into any matter connected with our social condition, the parties charged with such inquiries find themselves impeded at every step by the want of this information; they are compelled, amidst difficulties which can never be removed, except at a great cost, to begin and collect facts for their own guidance and information, and with very little aid from public records or official documents.

Even when a machinery exists, (as in the Customs and Excise) which, at a small expenditure, might be rendered available for collecting much valuable information of a statistical nature, no such use is made of it: whenever an article of commerce ceases to be subject to taxation, all accurate information as to its amount, consumption, and distribution is lost. On referring to the returns from the Customs, of Exports and Imports, we find a long and detailed list of articles of commerce; but when we proceed to inquire into the respective quantities and value of these, we discover that this information can only be obtained with regard to some, while as to others, all that we can learn is, that they are lumped under the general title of "Other Articles," and that no means exist of distinguishing them. Even the number of passengers that pass by steam boats between Great Britain and Ireland, is unknown to the Custom-house officers; and the Directors of the several Steam Packet Companies, to all of whom we applied, declined giving us any information on this subject. When we turn from the ports to the interior, we are equally at a loss. The Excise officers know nothing beyond the narrow limits of their immediate duties. With respect to the great fairs or markets of this country, no records are to be found of the produce or merchandise sold; even the information as to the amount of traffic along the roads, which turnpike receipts would supply, is not to be had in Ireland.

In this state, without any official aid, or authentic documents, we were thrown on our own resources, to procure such information as we best could in reference to the nature, amount, and direction of the internal traffic of the country. We were enabled through the kind permission of the Inspector General, to obtain the assistance of the Constabulary, who being spread in small detachments over Ireland, seemed peculiarly available for the purposes of such an inquiry. Having supplied instructions and Forms of Return to the several Constables, we received a mass of information, displaying, in many instances, considerable local knowledge, and very creditable intelligence; chiefly deficient, as might be expected, in showing the amount of merchandise or produce conveyed, but valuable as exhibiting the direction of the traffic, and the extent of country by which the various markets and fairs throughout the kingdom are respectively supplied. From these Returns, collated and compared with great labour, tested and corrected in those instances in which we had returns known to be accurate, such, for example, as those furnished from the Grand and Royal Canals,—Lieutenant Harness, of the Royal Engineers, has constructed the Traffic Map, which may be regarded as a mechanical representation of the direction and relative amount of the internal traffic of Ireland. For the details of construction, we refer to that gentleman's Report in Appendix No. III.

On referring to this Map, it will be seen that the largest and most remarkable line stretches to the westward from Dublin. This is on the line of the Grand Canal. It passes through Tullamore and falls into the river Shannon, at Shannon Harbour. From this point upwards to Athlone, and through Lough Ree to Carrick, and downwards by Limerick, to the sea, this remarkable river, or rather chain of lakes, is now partially navigated for a distance of about 150 miles by steam vessels, either carrying goods and passengers, or acting as steam tugs. A branch of the Grand Canal extending to Athy, there joins the Navigation of the river Barrow, which passes through the Carlow valley, and communicates with the important town and harbour of Waterford on the Suir. The Suir has been partly, though imperfectly rendered navigable up to Clonmel; the accommodation which it affords is, however, very inadequate to the wants of the country.

The Royal Canal, on leaving Dublin, runs parallel to and very near the Grand Canal for the first 52 miles, or as far as Mullingar; whence it takes a north-western course, passes by Ballymahon, throws off a branch to Longford, and terminates at Richmond Harbour, near Tarmonbarry, on the Shannon.

In the north, a very important work, the Ulster Canal, is now in progress, from Lough Neagh to Lough Erne, thus nearly connecting the eastern with the western shore, by a line extending from Belleek, near Ballyshannon, through Lough Erne, the Ulster Canal, Lough Neagh, and thence to Newry and Belfast. The Ulster Canal is now completed as far as Monaghan, and promises to be a most useful work. Besides these there are three small Navigations communicating with Lough Neagh; the Lagan from Belfast, one from Newry by the Upper Bann, and the third, called the Tyrone Navigation, extending from the collieries, at Coal Island near Dungannon, by the Blackwater, into Lough Neagh. The Lower Bann flows from the Lough to Coleraine, but is not navigable.

With a view to show the extent of accommodation which these several Canals and Navigations furnish to the trade of the country, and also to exhibit the progressive increase of that trade, we give the following particulars from Returns supplied to us by the different Companies.

And first, with respect to the Grand Canal, the length of the main line from Dublin to Shannon Harbour is 79½ miles, and from the Shannon to its termination at Ballinasloe, 9½ miles; the number of its branches is 7, and their aggregate length 65¾ miles. It will be seen by referring to the Return, Appendix B, No. 6, that

	The Total Tonnage carried was	Amount of Tolls.
In 1822 - - -	134,939 - - -	£24,866
1830 - - -	224,749 - - -	33,464
1836 - - -	226,770 - - -	38,953
1837 - - -	215,910 - - -	40,859

It will be observed that this increase has taken place chiefly on the valuable articles. Of these the tonnage carried in the undermentioned years was as follows:—

.	Flour.	Grain.	Meal.	Malt.	Cattle & Pigs.
In 1822 -	9,805 Tons	14,347 Tons	2,075 Tons	2,967 Tons	10
1830 -	14,221 ,,	19,500 ,,	2,407 ,,	4,719 ,,	643
1836 -	28,378 ,,	22,255 ,,	4,538 ,,	4,862 ,,	1,942

In 1830 the effect of the introduction of steam power on the Shannon, and the communication thereby established between Limerick and Liverpool, began to be felt on the Grand Canal.

In 1826, Mr. Grantham, an Engineer, who had been for some time employed by Government in surveying the river, made the first attempt to establish steam boats on the Shannon: he failed. A Joint Stock Company followed; to these succeeded the Inland Navigation Company, under the able management of a most enterprising individual, Mr. C. W. Williams. There are now nine steamers belonging to this Company on the Shannon; six above Limerick, and three below. Though this number is small when we consider the capabilities of this magnificent stream and its wide expanding lakes—it is important as a successful commencement; for the value of this Navigation is only now beginning to be understood. Before the application of steam to vessels as a propelling power, the means of developing these capabilities did not, in fact, exist. The boat or barge adapted to the stream, was little suited to traverse the lake, and the construction of towing paths along the shores of the latter would have been impracticable. The introduction of steam vessels not only surmounts this difficulty, arising from the expansion of the stream at intervals along its course, but, as the Shannon Commissioners have justly remarked, converts what was previously a formidable obstacle to the navigation of this noble river, into one of its great advantages.

The improvements of the navigation of this river, now in contemplation will, when executed, greatly increase the traffic, by facilitating the means of communicating with the adjacent country on either bank. A regular, active, and most beneficial trading intercourse has been established between Limerick and Liverpool. Below Limerick steam vessels now ply to Clare, three miles below Ennis, the county town of Clare, and to Kilrush and Tarbert, thriving places near the mouth of the river. The number of passengers between Limerick, Tarbert, Kilrush, and Clare, in 1836, amounted to 23,851. (App. B, No. 6.)

The nature and rapid growth of the Shannon trade are exemplified by the following Returns:—

RETURN of Tonnage carried by the Boats of the Inland Navigation Company, on the Shannon, during a period of Eleven Years.

	Tons.	Tonnage by Boats purchased from other Carriers.	Total.
In 1826,	2,004	—	2,004
1827,	6,304	—	6,304
1828,	8,456	—	8,456
1829,	8,850	—	8,850
1830,	11,270	—	11,270
1831,	17,595	550	18,145
1832,	23,587	2,200	25,787
1833,	24,119	2,200	26,319
1834,	30,438	4,125	34,563
1835,	33,683	7,050	40,733
1836,	40,239	7,050	47,289

RETURN of Goods carried from Limerick, and shipped at Dublin for Liverpool.

	Wheat.	Flour.	Oatmeal.	Butter.
In 1833,	187 tons.	520 tons.	543 tons.	4,998 firkins.
1834,	1,218 ,,	1,750 ,,	1,192 ,,	10,097 ,,
1835,	402 ,,	5,269 ,,	533 ,,	10,771 ,,
1836,	289 ,,	7,158 ,,	1,156 ,,	12,795 ,,

The gross freight from Limerick to Dublin, for corn, flour, or malt, is 15*s.* per ton; distance, 133 miles: the toll, 5*s.*, or, if intended for export, 3*s.* From Galway to Dublin, 21*s.*; toll, 5*s.* 11*d.*; distance, 138 miles.*

The gross freight from Dublin to Limerick, for merchandise, from 20*s.* to 30*s.*; toll, 5*s.* From Dublin to Galway, 38*s.* 6*d.*; toll, 9*s.* 1*d.*

With respect to the Royal Canal, the length of its Main Line from Dublin, by Leixlip, Maynooth, Mullingar, Killashee, to Richmond Harbour, near Tarmonbarry, where it falls into the Shannon, is 92 miles. From Killashee there is a branch to Longford; distance, five miles.

In 1834, the Total Receipts were,	£24,000	Total Expenses,	£11,376
1835, ,, ,,	24,082	,, ,,	10,740
1836, ,, ,,	25,148	,, ,,	11,912

This Canal was begun in 1789, and owes its origin to the efforts of a Director of the Grand Canal, who seceding from that Company on account of some trifling differences, resolved to form a rival Company. Being a person of considerable plausibility and energy, he succeeded; and if the only object of the new Company had been to injure the Grand Canal, they could not have devised a plan better suited to that end. They appear, however, to have overlooked the inevitable consequences to themselves of such ruinous competition.

The sanction of the Irish Parliament was obtained for this scheme, without any apparent examination of the grounds on which it claimed support, or of the calculations of its probable success. The effect of such rash and inconsiderate legislation might have been easily foreseen. After large sums both of private and public money had been expended on this work, the Company became bankrupt in 1812, with a debt of £862,000 Irish.

The debentures and stock of the Company, bearing an interest of 6 per cent., which had been, a few days previously, quoted on the Stock Exchange at 93, became unsaleable at any price, and the payment of interest totally ceased; in consequence of which numerous families of the middle rank of life, who had been induced by the high rate of interest, and by delusive statements of prosperity, to invest their capital in the concern, were suddenly reduced to a state of deplorable indigence.

Thus, through the culpable facility of that Parliament in acceding to the private views, and not very creditable feelings of an individual projector, not only were the immediate sufferers by his ill-digested scheme losers to the above amount, but its distressing effects extended themselves to the shareholders of the Grand Canal also, which, having been undertaken with the fairest prospects of success, was rendered altogether unprofitable by the competition so established. A total capital of two millions was irretrievably sunk in these unproductive speculations.

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* Forty-four miles of this distance—viz., from Galway to Ballinasloe, is land carriage.

On the failure of the Royal Canal Company, a Commission was appointed to inquire into the claim of the creditors. A grant of £200,000 was given by Parliament to extend the Canal from Coolnahay to the Shannon, and the present Company was incorporated by Act of Parliament, in 1818.

In the Appendix A, No. 7, we have given an extract from a Report by Messrs. Henry, Mullins, and Mac Mahon, dated February, 1823, from which it appears that the gross sum received and expended by the Grand Canal up to that time

Amounted to	£1,645,601*
And by the Royal Canal	1,421,954
Making a Total of	£3,067,555

According to the above mentioned Report, the expenditure per mile on the Grand Canal amounted to £8,442; and on the Royal Canal to £10,780, and it is there estimated that had these works been properly conducted, the cost need not have exceeded £3,800 per mile; further, there can be no doubt that one canal, with suitable branches, would have equally effected the object now attained by both. Thus a profitable return might have been obtained by the capitalist, and a waste of at least two millions of money prevented.

The Barrow Navigation.—At Athy, in the county of Kildare, a branch of the Grand Canal joins the river Barrow, which has been rendered navigable from thence to its junction with the river Suir below the city of Waterford. This has been effected by the construction of 17 locks, and the formation of a horse trackway. The capital expended amounts to £177,852. The Barrow flows through a rich agricultural country, traversing the fertile though narrow limestone valley of Carlow, and thence by Bagnalstown, St. Mullins, and Ross, to Waterford. The management of this work has been extremely creditable to the Directors; they have carried it successfully through many and great difficulties, and are but just beginning to reap the fruits of their perseverance and integrity. The interests of this Company are justly entitled to the most favourable consideration, and to every protection consistent with those of the public at large.

In 1800, the Tonnage was,	19,828 tons.	Amount of Tolls,	£1,405.
1835, „ „	66,084 „	„ „	4,966

The Navigation of the Suir extends from Waterford, by Carrick, up to Clonmel, a distance of nearly 40 miles; it is a very imperfect Navigation, and great difficulties are encountered by the boatmen in forcing the barges through the numerous shallows and rapids.

The Boyne Navigation.—The Boyne Navigation Company was incorporated in 1789. The Navigation is 19 English miles in length, extending from Drogheda to Navan.

A few years ago, some traders discovered that the Navigation Company had not a strict legal right to levy tolls on the lower portion; and it was necessarily transferred to the charge of the Board of Public Works. This portion is 12¼ miles in length, and is known by the name of the "Lower Boyne Navigation," extending from Drogheda to Carrick Dexter, near Slane.

The amount of tolls in 1837 was £775 17*s.* 1*d.*. The rate of freight is 3*s.* per ton, from Drogheda to Slane; toll, 1½*d.* per ton per mile. Nine miles of this Navigation were completed by the old Navigation Board, and local Commissioners, at an expense of £75,000, and a subsequent public grant of £12,500.

The revenue derived from it is adequate to cover the expense of maintenance, and for its gradual improvement.

Newry Navigation.—The length of the Newry Canal is 16½ Irish miles; it forms the communication between Newry and Lough Neagh, and between Newry and the Sea. In 1837, the tonnage amounted to 102,332; and the tolls to £3,505.

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* This sum is exclusive of £93,258, expended on the Shannon Navigation, and of £122,149 on the Grand Canal Docks at Dublin.

The Tyrone Navigation was executed at the public expense, with a view to encourage the working of certain collieries at Coal Island. Very exaggerated statements of the value and extent of the coal beds in that district were at that time made to Parliament, and as the means which geology has since unfolded of testing the accuracy of such statements did not then exist, they were too readily believed, and in consequence led, in very many instances, to a wasteful and useless expenditure.

The tonnage in 1836 amounted to 7,291; and it will be observed, that of the export tonnage, coals amounted only to 718 tons.

The Lagan Navigation was begun in 1753, for the purpose of connecting Belfast with Lough Neagh.

The tonnage in 1836 amounted to 44,700 tons; the tolls to £2,060 10*s*. 8*d*.

From Belfast to Coal Island the length of navigation is 61 miles: from Newry to Coal Island, 39½ miles.

The total tonnage carried by all the canals and navigable rivers may be taken at about 600,000 tons; and the amount of tolls at £71,242, if the tolls, on an average, be taken at 1*d*. per ton per mile. The average distance which the above tonnage is carried is about 30 miles.

With a view to form an estimate of the probable total amount of agricultural produce carried from the interior to the several ports of the kingdom, detailed accounts of the annual exports for several years prior to 1826, were examined by Lieutenant Harness, and the result as stated by him is equivalent to 437,000 tons. Supposing the increase since 1826 to be in proportion to the shipping cleared, the present exportation may be considered to amount to 680,000 tons; and after allowing 20,000 tons for eggs, wool, flax, and potatoes, from the returns furnished by the Customs to the Commissioners, the total export of agricultural produce may be assumed, with tolerable confidence, at 700,000 tons annually.

The population of the ports amounts to about 700,000, and allowing three-fourths of a ton per person for the consumption of the inhabitants and that of their horses, the quantity consumed would be 525,000 tons annually. The total annual produce carried at present from the interior to the several ports, may, therefore, be estimated at about 1,225,000 tons.

The consumption of Dublin, Cork, and other great ports, will, of course, materially exceed the general average: but it can hardly be above the truth to assume, that the return trade of Irish manufactures, including shop-goods, beer, and spirits, for the supply of the inland towns, as well as of the rural population—the poorest of whom are consumers of tobacco, spirits, and woollen cloth*—would consist of 1 cwt. annually for each individual of the population to be supplied. This would give 385,000 tons for the return trade: making, with the agricultural produce carried to the ports, 1,610,000 tons. This is the valuable portion of the inland traffic. It is carried on, for the most part, by the common cars of the country, at a very low rate—the charge not exceeding, on an average, 5*d*. per ton per statute mile; and the average distance of carriage is not less than 40 miles.†

The total amount of carriage to and from the ports will, of course, be very different from the above. Weighty and bulky articles, of small value, but in constant demand—such as stone, sand, lime, bricks, and flags—will generally be supplied from the immediate vicinity, or brought by sea, unless a canal or railroad should afford great facility and economy of transport; and in that case, a portion would be furnished from some convenient locality traversed by the canal or railroad, as in the case of Dublin. Estimating the quantity which would be brought in under such circumstances, according to the supply

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* Three-fourths of the frieze generally worn by the peasantry throughout Ireland, is now an article of import.

† We may here observe, that the carmen perform their contracts with singular fidelity and care. We have it on the evidence of several of the principal dealers in Dublin, that it rarely happens that they sustain any loss through these carmen; and that from long experience of their honesty, and the punctuality with which they deliver the goods entrusted to them, the merchants and tradesmen of towns are in the habit of confiding to them, with perfect confidence, and without any security, very valuable articles. The robbery of cars is very uncommon. Even in passing through disturbed districts they have seldom been interrupted or molested.

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of such articles furnished by the Grand and Royal Canals, it would appear that five-twelfths of a ton should be allowed for each inhabitant. Turf, coal, and manure, would also, with such facilities, become articles of transport for a considerable distance.

Lieut. Harness has endeavoured to form an estimate of the amount of inland traffic to and from the ports; the principles on which he proceeded are fully explained in his Report, Appendix No. III., and the results are as follows:—

TOWNS.	Supposed present Population.	Traffic to and from the Town.
Dublin - -	*265,000	966,000 Tons.
Cork - - -	110,000	400,000 ,,
Belfast - -	63,000	364,000 ,,
Limerick - -	70,000	264,000 ,,
Waterford - -	29,000	236,000 ,,
Galway - -	36,000	213,000 ,,
Londonderry - -	10,600	113,000 ,,
Drogheda - -	17,200	108,000 ,,
Newry - -	14,600	105,000 ,,
Sligo - -	18,000	102,000 ,,
Wexford - -	12,000	87,000 ,,
Dundalk - -	10,500	83,000 ,,
Youghal - -	10,000	72,000 ,,
Tralee - -	10,600	58,000 ,,

The remaining Ports are inconsiderable, both as to population and trade.

The preponderance of the first four towns is very great, and clearly establishes their claims, grounded on the amount of their traffic, to be leading points in any system of Railway communication in Ireland. When we look at that extensive and important portion of the country, bounded on the east by the Barrow, on the west by the Shannon, and stretching southward from the Grand Canal to the Sea,—and when we consider that within its limits are contained more than one-third of the whole population of Ireland,—the great towns of Cork, Limerick, and Waterford; the less important, but thriving towns of Kilkenny, Clonmel, Cahir, and Thurles,—that it possesses generally a soil of great fertility; but, with all these advantages, has no other communications but common roads, we are naturally led to the conclusion, that the Main Trunk Line to the south-west should be carried through the centre of this district.

To the westward the country is provided with two great canals, more than sufficient for the wants of the country in that direction; but to the north of the Royal Canal, and towards Belfast, no great line of communication, except by common roads, exists. On referring to the Map it will be seen, that a considerable stream of traffic, supplied from Virginia, Kells, and Enniskillen, passes from Navan towards Dublin; while the country approaching Belfast is traversed in every direction by small streams of traffic, strongly indicating the industry, activity, and trading spirit of that important district.

Atlas, Map No. 3.

At our desire Mr. Stanley undertook a series of inquiries respecting the carrying trade of the towns north of Dublin, and to his Report we would here refer for a variety of interesting information on this subject, (Appendix B, No. 4.) It will be observed, on looking at the Traffic Map, that the general direction of the trade of that district is towards the coast. A Railway from Dublin by Navan and Armagh to Belfast, would, therefore, in the first part of its course, receive at Navan all the traffic from that town, augmented by contributions from Virginia, Kells, and Enniskillen; it would again fall in at Armagh with the course of trade to and from Belfast; but in the intervening distance it would cross and intersect the stream of traffic flowing towards the coast, and would, therefore, be of very little service in facilitating and promoting the carrying trade of this part of the country. It is on the conveyance of passengers that this line of Railway must rest its chief claim to support as a work of public utility; and from this source its receipts would be principally derived. Such a line would, in this respect, possess advantages over almost any other in Ireland.

Atlas, Map No. 3.

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* The population of Dublin, within the county of the city, was, in 1831, 204,000; the population of the city and suburbs, 265,000.

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We shall now endeavour to form an estimate of the traffic which would be carried along a main line to the south-west, through the district we have above described; and also along a northern line to Belfast. For this purpose, let us suppose that the line to the south-west is that indicated on the map as passing through Thurles and Mallow to Cork, with branches to Limerick and Kilkenny; and that the line to the north is that represented as passing through Navan and Armagh to Belfast.

On the direct line of road between Dublin, Limerick, and Cork, an enumeration of the actual number of loaded carts, and of pigs, sheep, and lambs daily passing, was made by direction of the Commissioners, in the months of April and May, 1837,[*] (Appendix B, No. 2.) From that enumeration an estimate has been framed by Mr. Stanley, by which it appears, that the daily receipts on such a line to Cork, as we have supposed, would amount to £105. In this estimate, it is assumed, that the whole of the merchandize and produce enumerated, would be conveyed on the Railway; but no allowance is made for increase arising from greater facility and economy of transport. Lieut. Harness has also made an estimate for the same line, founded on general considerations as to the production, consumption, and consequent traffic from and to the districts traversed by the supposed line. The result is, that the carrying trade would be equivalent to 20,866 tons moved daily over one mile; this, at 2*d.* per ton, would give £173 17*s.* 4*d.* for the daily receipts. We refer to Lieut. Harness's paper for a clear statement of the principles on which this estimate is founded. (Appendix, No. III.)

Another mode of forming an estimate of the probable traffic, is derived from the tonnage and receipts on the Grand Canal, as given in the Appendix. As the Railway in question would pass through a country, generally speaking, superior in fertility to that traversed by the canal, and as the proposed freights by the former would be somewhat under the freights now charged on the latter; and further, as the Railway and its branches would terminate at large and important towns, whereas the canal and its branches terminate at places comparatively inconsiderable, it may be safely assumed, that with the exception of certain articles of great bulk or weight, but of small value, the tonnage carried on the Canal would be a fair measure, mile for mile, of the probable tonnage on the Railway.

From the return of the trade on the Grand Canal above referred to, we select the articles which we consider would be carried on a Railway :—

Towards Dublin.

Articles.	Tonnage. Tons.	Cwts.	Gross Freight, including Toll. £	s.	d.
Flour, - - -	24,947	15	10,342	7	2½
Grain, - - -	20,890	15	10,277	7	1
Meal, - - -	4,456	15	2,736	1	1
Malt, - - -	3,769	15	1,974	8	5½
Potatoes, - -	2,683	10	559	0	10
Hay, - - -	420	0	35	11	1
Cattle and Pigs, -	2,129	10	873	17	1
Sundries, - -	19,685	0	10,878	2	2
Total, - -	78,983	0	37,676	15	0
From Dublin.					
Coal and Coke, -	6,015	15	1,048	0	1½
Sundries, - -	25,931	5	10,661	0	4½
Total, - -	31,947	0	11,709	0	6
Grand Total, -	110,930	0	49,385	15	6

The above sum, *i. e.*, £49,385 15*s.* 6*d.*, includes £5,669 7*s.* 1*d.* for traffic, derived from the Shannon; and deducting this, there remains £43,716 8*s.* 5*d.* annual income proper to the Canal, which is equivalent to £119 15*s.* 5*d.* per day.

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[*] It should be stated, that April and May was an unfavorable period for ascertaining the average quantity of agricultural and mercantile traffic on the different roads, inasmuch as the greater part, if not the whole of the corn, &c., derived from the last harvest, would have been previously sold, and delivered in Dublin or the other export markets. We need not, therefore, be surprised at the deficiency of this species of traffic, as ascertained by Mr. Stanley's Enumeration.

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The length of the Canal and its branches is 164 miles, and the length of the Railway and its branches about 229 miles. Supposing, now, the prices, &c., the same per mile on both, viz., on the Canal and Railway, the income from the Railway, at Canal prices, would be £167 9*s.* 9¾*d.* per day.

It must, however, be observed, that the Canal charges average nearly 2¾*d.* per ton per mile, whereas the Railway charge will, on an average, be about 2*d.* per ton per mile; but as the facilities will be greater by the latter than by the former, the charge less, and the country itself more fertile, we do not hesitate to assume this income, which is equivalent to 20,066 tons carried one mile per day, or 87$\frac{57}{229}$ tons per day through the whole line.

The probable accuracy of this estimate is borne out by a Report drawn up by Mr. Griffith, in the year 1826, respecting a Railway then in contemplation between Cork and Limerick, passing through Mallow and Charleville.

In this Report it is stated, as the result of a careful and long-continued enumeration, that the daily average number of tons drawn from Cork to Mallow, a distance of 22 miles, amounted to 48 tons; and from Mallow to Cork, to 58 tons, equal to 106 tons in both directions. And between Mallow and Charleville, also a distance of 22 miles, the average number of tons drawn, daily, over every mile amounted to 50 tons, which gives a general average between Cork and Charleville of 78 tons per mile; which, considering the progressive increase in the traffic of the country, is consistent with our result, which gives an average of 87 tons per mile.

An estimate may, in like manner, but with some modification, be formed for the Northern Line. For that part of the line between Dublin and Navan, and also for the part between Armagh and Belfast, the same proportionate receipts, as in the case of the Southern Line, might be calculated upon; but with respect to the portion between Armagh and Navan, we do not think that more than one-fourth of the proportionate receipts could be allowed, for the reason which we have previously adverted to, viz., that the direction of the traffic to the ports on the coast, is directly across this part of the supposed line of Railway.

Between Dublin and Navan, and between Armagh and Belfast, the total daily receipts, estimated as above, would amount to £46 6*s.* 8*d.*; distance, 64⅛ miles. Between Armagh and Navan, the receipts would be £10 9*s.* 11*d.*; distance, 57½ miles. Total, £56 16*s.* 7*d.*

No allowance has been made in these estimates for the increase which would attend the progressive improvement of the country. They are framed in reference to an additional facility in the transport of the existing trade; but the evidences of growing prosperity are such as can leave no doubt, that even without taking into account the powerful impulse which would be given to the general industry of the country, through the operation of such Railways, a considerable addition might, in the course of a few years, be reasonably expected.

A comparison of the exports and imports at the present time, with those of 1826, presents striking proofs of the increasing commerce of Ireland. Since the latter period, when the duties on all merchandise passing between the ports of Great Britain and Ireland were repealed, no official accounts have been kept of the trade between the two countries.

It is greatly to be regretted, that on a matter so important, and capable of affording so useful an indication of the condition of the country, documents having official authority cannot be referred to. To supply this deficiency we applied to the Commissioners of Customs, who directed their Collectors at the several ports to prepare the Returns given in the Appendix B, No. 9. From these Returns the Table of Exports and Imports for 1835, Appendix B, No. 10, has been compiled. In Porter's Tables we find a similar table for 1825.

A comparison of these tables, shows not only an extraordinary augmentation of the exported produce of the country, but a greatly increased consumption of the articles most conducive to the comfort of its inhabitants.*

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* We regret that the state of the labouring population does not warrant us in assuming that any considerable portion of this increased consumption is shared by them. The demand seems to proceed, almost exclusively, from the superior class of landholders, and the inhabitants of the towns.

Thus, the amount of Exports was:—

		In 1825.	In 1835.
Cows and Oxen,	in number	63,524	98,150
Sheep,	in number	72,191	125,452
Swine,	in number	65,919	376,191
Wheat,	in quarters	283,340	420,522
Barley,	in quarters	154,822	168,946
Oats,	in quarters	1,503,204	1,575,984
Meal and Flour,	in cwts.	599,124	1,984,480
Butter,	in cwts.	474,161	872,009
Bacon, Hams, Beef, &c.,	in cwts.	966,531	749,283
Beer,	in gallons		2,686,688
Linen,	in yards	55,114,515	70,365,572

The amount of Imports, was:—

Cotton Manufactures,	in yards	4,996,885	14,172,000
Woollen Manufactures,	in yards	3,384,918	7,884,000
Tea,	in lbs.	3,889,658	4,794,316
Coffee,	in lbs.	335,921	1,205,762

The employment of steam vessels in the transport of goods, as well as in the conveyance of passengers, has greatly contributed to the results exhibited by these returns. Exportations are not only greatly augmented in quantity, but a variety of articles are shipped for the markets of Liverpool, Glasgow, and Bristol, which could not possibly be sent by common sailing vessels; and the demand in these markets, for all kinds of Irish produce, now supplied with great regularity, economy, and despatch, is assisting materially in the development of capabilities, as yet but imperfectly understood and appreciated.

To give full effect to this superior means of transport, and to render its advantages generally and extensively available to the country, it is of the first importance to improve and extend the communication from the great ports to the interior.

Arranging the several ports according to their importance, as indicated by the amount of their tonnage in 1836, we have—

Names of Ports.	Total Tonnage of Exports and Imports.	Population in 1831.
Dublin	590,000	265,000
Belfast	315,000	53,287
Cork	280,000	107,016
Waterford	248,000	28,821
Limerick	121,500	66,554
Londonderry	94,000	19,620
Drogheda	90,000	17,365
Newry	90,000	13,065
Galway	73,000	33,120
Wexford	70,000	10,673
Dundalk	66,000	10,078
Youghal	58,000	9,608

The Tonnage of the remaining Ports is inconsiderable.

There are also other indications of the increasing activity of commercial intercourse. Deducting the Ordnance postage, not charged in 1837, the postage received in the different towns in Ireland, amounted in 1827, to £192,244; in 1837, to £255,070.

It appears also by a Return forwarded to us by the Secretary to the Post Office that the receipts in the undermentioned counties were as follows:

	1836.
In Dublin,	£75,726
„ Cork,	25,415
„ Antrim, (Belfast,)	16,587
„ Tipperary,	10,845
„ Limerick,	9,185
„ Down,	8,824
„ Waterford,	7,325
„ Kilkenny,	4,688

The manner in which the several Banks are distributed over the country, and the dates of their establishment, are also worthy of observation: we refer to the Return given in the Appendix B, No. 16. It will be seen, that by far the greater number have been opened since 1833.*

In Cork City there are	4
,, ,, County, including City	17
,, Belfast	6
,, Antrim County, including Belfast,	16
,, Londonderry City,	5
,, ,, County, including City	14
,, Armagh City	6
,, ,, County, including City	14
,, Tipperary County	13
,, Waterford City,	4
,, ,, County, including City	7
,, Down County	7
,, Limerick City	4
,, Galway Town	4
,, ,, County, including the Town	10

We are fully aware that such evidence as this must be received with caution, as a proof of commercial activity. The extension of business in this way, unless it can be shown to be grounded and conducted on sound principles, is an uncertain criterion of prosperity; and we have not the means of forming a scale of the relative amount of legitimate Banking transactions in Ireland. That they have greatly increased since the Provincial Banking Company was formed, and are increasing, there can be no doubt. The inadequacy, or unwillingness of existing establishments to meet the wants of the community, gave rise to that Company, and essential benefit has been derived from its operations. It afforded the extended accommodation required by the increasing business of the country, and through its numerous branches greatly assisted, without unduly stimulating, commercial enterprize. It has, from its commencement, enjoyed the confidence of the public, and has set an example of judicious management well deserving of imitation.

Collecting the various facts and circumstances above stated, we perceive that they show not only a marked and progressive improvement in the country at large, but clearly exhibit the relative condition and superiority of certain districts as compared with others. If, therefore, our object, in proposing a system of Railways for Ireland, be to conduct the Main Lines through the counties where trade is most active and extensive, the evidence above collected points out that our first efforts should be directed to connect Dublin with the counties of Armagh, Down, Antrim, &c., in the north; and with Cork, Limerick, Tipperary, Waterford, &c., in the south. The counties to the westward are provided with direct water communication with Dublin, by means of the Grand and Royal Canals, and seem less to require, and less able to support the expense of Railway communication.

We shall now proceed to inquire into the state of travelling throughout the country, with a view to ascertain whether the relative amount of passenger traffic on different roads, marks more particularly the districts and towns which should be embraced in a general system of Railways, and thus indicates more precisely the course which the Main Lines above adverted to should follow.

3. PUBLIC CONVEYANCES.

We have been enabled to collect more definite information in regard to this important subject, than we could by any effort obtain with respect to the traffic. We would here acknowledge our obligations to the Constabulary, for their valuable assistance in collecting this information; forms of return, with instructions, were supplied to them, which were filled up from actual inquiry and enumeration. From these documents, the Tables in the Appendix, exhibiting the whole passenger traffic of the country have been constructed. Appendix B, No. 5.

Appendix B, No. 5.

The Constabulary Returns have been checked and compared, when admitting of such comparison, with Returns furnished from the Post

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* The total Bank Note Currency in Ireland amounts to £5,029,500, and it is supposed that the proportions in the four provinces are nearly as follows:—

In Leinster	£1,700,000	In Ulster	£1,400,000
Munster	1,300,000	Connaught	600,000

PART I. Office; and with others supplied from the establishments of Messrs. Purcell, Bourne, Gosson, Bianconi, and Fairlie. We have also received valuable Returns from the Grand and Royal Canal Companies,* of the number of passengers by the ordinary passage boats and by the fly boats recently established. For these returns see Appendix B, No. 6.

Atlas, Map No. 4. From the united information thus obtained, a Map has been compiled, under the superintendence of Lieutenant Harness, which shows the direction and relative amount of travelling throughout the country, and denotes, by figures at the side of the lines, the average number of persons passing weekly, by public conveyances of all kinds, between the places shown on the Map.

We believe that this Map presents a faithful and accurate picture, and will convey a more clear and distinct idea of the state of travelling on the several routes than could be readily given by any other means.

It will be seen that the largest stream is from Dublin towards Naas, where it divides into three branches—the one by Carlow, Kilkenny, and Clonmel, to Cork; the other by Mountrath, Roscrea, and Nenagh, to Limerick; while the third, passing along the Grand Canal, is chiefly dissipated among the small towns on its banks, a small portion reaching Ballinasloe. Next in importance are the streams through Balbriggan and Ashbourne, uniting at Drogheda, and thence continuing to Newry; at which town a branch separates towards Armagh, where it is again sub-divided into smaller branches; the principal of which pass by Caledon, to Omagh and Strabane, on the left, and to Moy, Dungannon, and Cookstown, on the right. The main line from Newry continues through Lisburn to Belfast. Next in magnitude to these two great lines is the stream direct to the west, through Lucan, Maynooth, Enfield, Clonard, and Kinnegad, where a branch separates to Athlone, by Kilbeggan; the main line continuing to Mullingar, and thence to Longford; from which a small stream passes through Carrick-on-Shannon and Boyle to Sligo. The Athlone branch continues to Ballinasloe, where another small division takes place, a portion diverging to Tuam and Castlebar, while the larger passes on by Loughrea to Galway. The Royal Canal runs close to the main route, touching it at several points; passing by Mullingar, and communicating with Longford by a branch from Killashee. Swift boats are now established as far as Mullingar, 52 miles, which they reach in eight hours from Dublin; and the common or slow passage boats ply regularly between Dublin and Longford, performing the journey in twenty-three hours.

Next in point of consideration is a stream to the north-west; it branches off on the left at Clonee to Trim, and to Navan on the right, passing through the latter place to Kells, Cavan, and Enniskillen.

We shall now proceed to show the important use to which the Passenger Map admits of being applied: we are enabled, through its means, to determine the number of passengers that would probably resort to any line that can be proposed. In making this calculation, we divide the proposed line of Railway into certain portions, differing in length, according as the Passenger Map shows that the number of passengers in each portion would continue with little variation through its entire extent. The passengers by the collateral routes are included when it appears that the place to which they are travelling would be most conveniently reached by proceeding along the Railway to the point nearest such place.

Supposing then that Railways were to be constructed to Cork, Belfast, and Mullingar, according to the lines indicated on the map, the following are the estimates for these lines, which the Passenger Map furnishes:— Atlas, Map No. 4.

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* We have great pleasure in acknowledging the information supplied to us by Mr. M'Mullen, the intelligent and zealous Secretary to the Grand Canal Company, and we are indebted to his exertions for the valuable Returns on which many of our calculations are founded.

CALCULATION made from the PASSENGER MAP of the NUMBER of PASSENGERS that would probably travel on the MAIN TRUNK LINE, from DUBLIN to CORK, by THURLES, and on the BRANCHES from that LINE to KILKENNY and LIMERICK.

Total Distance from Dublin in Statute Miles	SOUTHERN LINE.	Average Number of Passengers, weekly, in one direction.	Distances between Intermediate Stations.	Equivalent Number moved one Mile, in one direction, weekly.	Equivalent Number moved one Mile, in one direction, daily.
	FIRST PART OF MAIN TRUNK. From Zero of Mileage at Inchicore Avenue. From Dublin to separation of Branch to Kilkenny at (*c*).*				
11	I.—From Dublin to the nearest point to Leixlip (*a*).				
	1. Passengers to Leixlip, say one-half,	447			
	2. Do. to Naas by Coaches and Cars,	950			
	3. Do. to Naas by Canal,	583			
		1,980	11	21,780	3,111 3/7
18¼	II.—From (*a*) to the point where the Railway crosses the Grand Canal at (*b*).				
	1. Passengers to Naas by Coaches and Cars,	950			
	2. Do. to Naas by Canal,	583			
	3. Do. to Celbridge and Clane, say	60			
		1,593	7¼	11,549¼	1,649 25/28
32¾	III.—From (*b*) to the place where the Line crosses the Branch of the Grand Canal to Athy, north of Monasterevan, at (*c*).				
	1. Passengers by Coach, Cars, &c. to Monasterevan,	245			
	2. Do. to Rathangan, through Newbridge,	48			
	3. Do. to Kilkenny, *via* Carlow, (X),†	196			
	4. Do. to Athy,	180			
	5. Do. to Athy by Canal,	195			
	6. Do. to Limerick by Canal and Shannon (L), say	58			
		922	14½	13,369	1,909 6/7
49½	IV.—From (*c*) to where the Line crosses the Passenger Line between Mountmellick and Maryborough, close to Maryborough, at (*d*).				
	1. Passengers from Kildare to Maryborough.	221			
	2. Do. from Monasterevan to Portarlington, and thence to Mountmellick,	90			
	3. X,	196			
	4. Passengers by Athy and Castlecomer, to Kilkenny (Y),	66			
	5. Do. to Cork, by Athy, Stradbally, and Cashel (see the Number shown between Durrow and Johnstown, M),	35			
	6. Passengers, by Canal, to Mountmellick,	87			
	7. L,	58			
		753	16¾	12,612¾	1,801 23/28
52½	V.—From (*d*) the point where the Branch to Kilkenny leaves the Main Line at (*e*).				
	1. Passengers from Maryborough to Mountrath,	180			
	2. Do. on from Portarlington, by Coach or Car, and Canal, to Mountrath, say ⅔rds of the Number shown between Maryborough and Mountrath,	18			
	3. Passengers from Maryborough by Abbeyleix, to Kilkenny, say ⅔rds of the Number shown between Maryborough and Abbeyleix,	44			
	4. X,	196			
	5 Y,	66			
	6. M,	35			
	7. L,	58			
		597	3	1,791	255 6/7
	TOTAL, FIRST PART MAIN TRUNK,		52½	61,102	8,728 6/7
	SECOND PART OF MAIN TRUNK. From separation of Kilkenny Branch at (*e*), to separation of Limerick Branch at (*h*).				
61	I.—From (*e*) to the nearest point to Mountrath (*f*).				
	1. Passengers from Maryborough to Mountrath,	180			
	2. Do. on from Portarlington and Mountmellick to Mountrath,	18			
	3. M,	35			
	4. L,	58			
		291	5	1,455	207 6/7

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* The letters in Italics refer to the corresponding letters marked in red upon Map No. 4, in the Atlas.

† The capital letters, X, Y, &c., are employed to avoid the repetition of the words at the end of which they first occur.

PART I.

CALCULATION made from the PASSENGER MAP of the NUMBER of PASSENGERS that would probably travel on the MAIN TRUNK LINE from DUBLIN to CORK, by THURLES, and on the BRANCHES from that LINE to KILKENNY and LIMERICK—(*continued.*)

Total Distance from Dublin in Statute Miles.	SOUTHERN LINE (*Continued.*)	Average Number of Passengers weekly in one direction.	Distances between Intermediate Stations.	Equivalent Number moved one Mile, in one direction, weekly.	Equivalent Number moved one Mile, in one direction daily.
66	II.—From (*f*) to nearest point in Borris-in-Ossory at (*g*).				
	1. Passengers that now pass through Mountrath, Roscrea, and Nenagh to Limerick, Q, - - - - - -	122			
	2. Passengers to Roscrea and Nenagh, N, - - -	30			
	3. Do. from Mountrath to Rathdowney, Templemore, and Thurles, say two-thirds of 27, - - -	18			
	4. Passengers from Dublin, by Carlow, through Kilkenny, to Clonmel and Cork, - - - - - - 5. Passengers from Dublin, by Athy and Castlecomer, through Kilkenny to Clonmel and Cork, Z, - } Z,	113			
	6. M, - - - - - - - - -	35			
	7. L, - - - - - - - - -	58			
		376	8½	3,196	$456\frac{4}{7}$
89¾	III.—From (*g*) to the point where the Limerick Branch separates to the right at Holycross (*h*).				
	1. Q, - - - - - - - - -	122			
	2. Passengers from Mountrath to Rathdowney, Templemore, and Thurles, say two-thirds of 27, - - - - -	18			
	3. M, - - - - - - - -	35			
	4. Z, - - - - - - - -	113			
	5. L, - - - - - - - -	58			
		346	23¾	8,217½	$1{,}173\frac{13}{14}$
	TOTAL, SECOND PART MAIN TRUNK, - -		37¼	12,868½	$1{,}838\frac{5}{14}$
	THIRD PART OF MAIN TRUNK, From separation of Limerick Branch at (*h*) to Cork,—76¾ miles.				
98	I.—From (*h*) to Cashel.				
	1. Z, - - - - - - - - -	113			
	2. Passengers from and through Thurles, 110; deduct Limerick Passengers through Tipperary, 40, - - - - -	70			
	3. M, - - - - - - - - -	35			
		218	8¼	1,798½	$256\frac{13}{14}$
104¼	II.—From Cashel to the point (*l*), where the Limerick and Waterford Line crosses the Cork Line.				
	1. Z, - - - - - - - - -	113			
	2. Passengers direct between Cashel and Clonmel, - -	70			
	3. M, - - - - - - - - -	35			
		218	6¼	1,362½	$194\frac{9}{14}$
125¾	III.—From (*l*) to the nearest point to Mitchelstown and Fermoy at (*m*).				
	1. Passengers, at present, through Clonmel and Cahir to Mitchelstown, - - - - - - - -	95			
	2. Passengers from Clonmel, by Clogheen and Ballyporeen, to and through Fermoy, S, - - - - - -	35			
	*3. Passengers from Limerick to Cork, by Mallow and Kildorrery, V, - - - - - - -	103			
		233	21½	5,009½	$715\frac{9}{14}$
145½	IV. From (*m*) to Mallow.				
	1. Passengers through Mitchelstown, by Fermoy, to Cork, (*W*), say one-half of the Number shown between Mitchelstown and Fermoy, - - - - - - -	90			
	2. S, - - - - - - - - -	35			
	3. Passengers from Kildorrery, Castletownroche, Doneraile, -	9			
	4. V, - - - - - - - - -	103			
		237	19¾	4,680¾	$668\frac{19}{28}$
166½	V. From Mallow to Cork.				
	1. W and S, - - - - - - - -	125			
	2. Passengers through Mallow to Cork, - - -	220			
	3. Do. from Kantork to Cork, - - - -	72			
	4. Two-thirds of Limerick and Cork Passengers, by Kilmallock and Kildorrery, - - - - - - -	32			
		449	21	9,429	1,347
	TOTAL, THIRD PART MAIN TRUNK, - -		76¾	22,280¼	$3{,}182\frac{25}{28}$

* Say two-thirds of { 107, the Number shown between Kilmallock and Charleville; and 48, the Number shown between Kilmallock and Kildorrery.

CALCULATION made from the PASSENGER MAP of the NUMBER of PASSENGERS that would probably travel on the MAIN TRUNK LINE from DUBLIN to CORK, by THURLES, and on the BRANCHES from that LINE to KILKENNY and LIMERICK—(*continued.*)

PART I.

Total Distance from Dublin in Statute Miles.	SOUTHERN LINE (*Continued.*)	Average Number of Passengers, weekly, in one direction.	Distances between Intermediate Stations.	Equivalent Number moved one Mile, in one direction, weekly.	Equivalent Number moved one Mile, in one direction, daily.
	BRANCH TO KILKENNY.				
	1. Passengers through Maryborough, by Abbeyleix, Ballyragget, to Kilkenny, - - - - - - -	66			
	2. Y, 66 } 3. X, 196 } Deduct Cork Passengers. 113, - - -	149			
		215	26½	5,697½	813 13/14
	TOTAL, KILKENNY BRANCH, - -		26½	5,697½	813 13/14
	BRANCH TO LIMERICK.				
103	I.—From (*b*) where the Limerick Branch leaves the Main Line, to the point at which the Line to Waterford leaves the Limerick Branch (*o*).				
	1. Q, - - - - - - - - -	122			
	2. Passengers from and through Thurles, by Cashel, Tipperary, &c., to Limerick, say, - - - - - -	40			
	3. L, - - - - - - - -	58			
		220	13¼	2,915	416 3/7
125½	II.—From (*o*) to Limerick.				
	1. Q, - - - - - - - -	122			
	2. Passengers from Clonmel, through Tipperary, - -	80			
	3. V, - - - - - - - -	103			
	4. L, - - - - - - - -	58			
		363	22½	8,167½	1,166 11/14
	TOTAL, LIMERICK BRANCH, - -		35¾	11,082½	1,583 3/14

SUMMARY.	Length of Lines	PASSENGERS.	
		Equivalent Number moved one Mile, in one direction, weekly.	Equivalent Number moved one Mile, in one direction, daily.
	Statute Miles.		
MAIN TRUNK, FIRST PART, - - - - - -	52¼	61,102	8,728 6/7
„ SECOND PART, - - - - - -	37¼	12,868½	1,838 5/14
„ THIRD PART, - - - - - -	76¾	22,280¼	3,182 25/28
TOTAL, MAIN TRUNK FROM DUBLIN TO CORK, -	166¼	96,250¾	13,750 3/28
KILKENNY BRANCH, - - - - - - - -	26½	5,697½	813 13/14
LIMERICK BRANCH, - - - - - - - -	35¾	11,082½	1,583 3/14
TOTAL, MAIN TRUNK AND BRANCHES, - -	228½	113,030¾	16,147¼

Of this number, viz., 16,147¼, 3,020 are carried by canal; the remainder, 13,127, are travellers by public conveyances on the roads. It was further ascertained by the enumerators on these lines, that the proportion of persons thus travelling, to those who travel in post and in private carriages, was as 4 to 1; adding, therefore, one-fourth, we have 16,409 for the total number of passengers on the roads, and, including the canal passengers, we have 19,429 for the total equivalent number moved one mile in one direction.

It will be observed, that this calculation is made solely with reference to the number of persons now travelling; it does not suppose any addition to that number which would be the consequence of the superior facilities afforded by a Railway, but it includes those passengers who would be drawn by such facilities from the collateral routes.

These two sources of increase are frequently confounded; it being very common to regard the number of passengers by a Railway, compared with the number that travelled the same line of road previously, as the exact measure of the increased intercourse, whereas, in general, it is, to a large extent, but a concentration of the travelling to and from places not on the immediate line of Railway, but which by means of it have become accessible, at less expense or in less time than by the direct common roads.

When a Railway is once formed, it is seldom, perhaps, considered material to distinguish from what source the augmentation proceeds; but when forming an estimate, by which the propriety of undertaking a work of great magnitude must be determined, it is important to endeavour to distinguish them. We shall consider the passengers then as composed of two classes, and designate them by the terms *Principal* and *Secondary;* the first being those for whom the proposed communication would be a direct, the second, those for whom it would be an indirect accommodation. The first receive the whole advantage which a Railway can give, the second only a portion. The degree of accommodation will, in the latter case, depend either on the lateral distance of the place of destination from the line, or on the distance beyond its termination. The limit of lateral distance will be determined when the time or expense of travelling in part by Railway and in part by the common road, is equal to the time or expense of reaching the same point by the original route; and its extent will become greater, in proportion as the rapidity and economy of travelling by the former shall increase. Along the intermediate space, the number of Passengers will vary from nothing to the greatest increase which the Railway is capable of producing. We therefore consider, that an increase equal to one-half that allowed for the principal class may, on an average, be safely allowed for the secondary class.

In the present instance, after fully and carefully inquiring into what has happened in other cases, and making allowance, as far as possible, for difference of circumstances, we are of opinion that an increase of 100 per cent. on the principal class may be fairly calculated upon, and 50 per cent. on the second. With respect to Canal passengers, the increase which follows cheapness and facility, must be supposed to have already taken place to a considerable extent. The rate per mile on the Canal being from 0⅝*d.* to 1¼*d.*, whereas by the coaches it is from 3*d.* to 4*d.*

The Return from the Grand Canal Company distinguishes two classes—the first and second cabin passengers. The fare for the latter is about ⅝*d.* per mile; for the former 1¼*d.* The lowest fare by the Railway would be 1*d.* per mile. There would be no inducement therefore, in point of economy, for the second class to change their present mode of travelling, as a saving of expense is with this class a greater object than a saving of time; still we have no doubt the rapidity of the Railway would lead to some increase in the second class, probably 15 per cent.; but with regard to the first class, 50 per cent. might, we think, be safely allowed. In the valuable return above mentioned we find that the number of first cabin passengers is to that of the second cabin as 2 to 5; so that 50 per cent. more on the former, and 15 per cent. on the latter, would amount to about 25 per cent. on the whole number. Referring, then, to the preceding estimate, we find that the passengers by public conveyances, may be thus divided:

Principal Class, ...	7855	Secondary Class, .	5272	Canal, . .	3020
For probable increase allow 100 per cent., . .	7855	50 per cent., . . .	2636	25 per cent.,	755
	15710		7908		3775

The travellers by post and in private carriages are 3,282, dividing these in the same proportion, and into the same classes, and allowing the same per centage for increase, we have to add 3,927 to the first class, and 1,927 to the second. We have further an allowance to make for parcels; this is very commonly taken in England, with respect to coaches, at about one-fifth of the proceeds arising from passengers. If this be correct for England, the proportion will be considerably smaller in Ireland; besides, the cars, which form so considerable a proportion of the public conveyances of this country, carry but few parcels: it is probable, therefore, that an allowance equivalent to one-tenth of the passengers by public conveyances, or, 1,312 would not be far from the truth.* Collecting these various items we have

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* From a Return supplied to us by Mr. Bourne, this seems to be the proportion on the Limerick road.

PART I.

34,609 for the estimate of the total equivalent number for one mile in one direction, or 69,218 in both directions.

We have two other estimates derived from entirely different data, with which to compare this result; one founded on the actual enumeration made under the direction of Mr. Stanley, Appendix B, No. 5; and the other prepared at our request, by Lieut. Harness, Appendix No. III., on principles which admit of a very general and useful application. According to the enumeration, the equivalent number of passengers moved one mile in one direction is 19,848; this includes travellers by all kinds of conveyances both public and private on the road, but it does not include passengers by the Canal. Dividing this number into principal and secondary passengers, in the same proportion as in the first estimate, and allowing the same proportion of increase in each class, we have

For Principal Class,	11,877	
Increase of 100 per cent.,	11,877	
		23,754
For the Secondary Class,	7,971	
Increase of 50 per cent.,	3,985	
		11,956
Canal Passengers, same as before,	3,775	
Allowance for Parcels,	1,312	
		5,087
Total in one direction,		40,797
		2
Total in both directions,		81,594

According to the estimate of Lieut. Harness, the number of passengers in both directions on the Main Line and branches, would be 67,817. This number includes the probable increase which would follow the establishment of a Railway, but it is dependent on the assumption that the number of Passengers by the swift and slow Boats on the Grand Canal, may be taken as a measure of the number which, under similar circumstances would travel by a Railway. This number, we have seen, requires to be increased 25 per cent., making the number by this estimate 84,771.

Collecting these different results, we have—

	Miles.		Equivalent Number moved one Mile.
Length of Main Line and Branches,	228¾	According to Estimate No. 1,	69,218
		,, to Estimate No. 2,	81,594
		,, to Estimate No. 3,	84,771
			235,583
		Mean	78,527

This number divided by 228¾, gives 342 for the average number moved daily over every mile of Railway, for every day in the year.

Proceeding in the same manner with regard to the Northern Line, we have the following table:—

CALCULATION made from the PASSENGER MAP of the NUMBER of PASSENGERS that would probably travel by a LINE of RAILWAY from DUBLIN to ARMAGH, and thence on to BELFAST.

Total Distance from Dublin in Statute Miles.	NORTHERN LINE.	Average Number of Passengers, weekly, in one direction.	Distance.	Equivalent Number moved in one direction, weekly.	Equivalent Number moved in one direction, daily.
28	FIRST PART.—FROM DUBLIN TO NAVAN.				
	1. All Passengers to Navan, - - - - -	258			
	2. Do. do. to Trim, - - - - -	180			
	3. Do. do. through Dundalk to Newry, Belfast, and Armagh, X, - - - - - -	361			
	4. To Slane to Ashbourne, - - - - -	70			
	5. To Navan through Ashbourne, - - - -	30			
	6. To Ardee, - - - - - -	14			
	7. From Dublin to Dundalk, - - - - -	35			
		948	28	26,544	3,792
51	SECOND PART.—FROM NAVAN TO CARRICKMACROSS.				
	1. X, - - - - - - - - -	361			
	2. Through Slane and Carrickmacross to Castleblaney, -	52			
	3. From Navan through Kingscourt, - - - -	24			
	4. Through Ardee to Louth, - - - - -	14			
	5. From Dublin to Dundalk, - - - - -	35			
	6. From Dublin to Enniskillen by Cavan, - - -	61			
		547	23	12,581	1,797$\frac{2}{7}$
64	THIRD PART.—FROM CARRICKMACROSS TO CASTLEBLANEY.				
	1. X, - - - - - - - - - -	361			
	2. Through Slane and Carrickmacross to Castleblaney, -	52			
	3. From Navan through Kingscourt, and on to Cootehill, -	24			
	4. From Dublin to Enniskillen by Cavan, - - -	61			
		498	13	6,474	924$\frac{6}{7}$
85½	FOURTH PART.—FROM CASTLEBLANEY TO ARMAGH.				
	1. Passengers from Dublin, through Newry to Belfast, Y, -	196			
	2. Do. through Newry to Armagh, - - -	105			
	3. Do. from Monaghan, through Castleblaney to Armagh,	14			
		315	21½	6,772½	967½
	FIFTH PART.—FROM ARMAGH TO PORTADOWN.				
	1. Y, - - - - - - - - -	196			
	2. Passengers from and through Armagh and Portadown, -	172			
	3. From Moy to Portadown, - - - - - -	48			
		416	10⅞	4,524	646$\frac{2}{7}$
	SIXTH PART.—FROM PORTADOWN TO LURGAN.				
	1. Y, - - - - - - - - -	196			
	2. From Portadown to Lurgan, - - - - -	274			
		470	5¼	2,467½	352½
	SEVENTH PART.—FROM LURGAN TO LISBURN.				
	1. Y, - - - - - - - - -	196			
	2. From Lurgan to Lisburn, - - - - - -	346			
		542	12	6,504	292$\frac{1}{7}$
	EIGHTH PART.—FROM LISBURN TO BELFAST,	2,000	8	16,000	2,285$\frac{5}{7}$

SUMMARY.	Distance in Statute Miles.	PASSENGERS.	
		Equivalent Number moved in one direction, weekly.	Equivalent Number moved in one direction, daily.
I. From Dublin to Navan, - - - - - -	28	26,544	3,792
II. „ Navan to Carrickmacross, - - - - -	23	12,581	1,797$\frac{2}{7}$
III. „ Carrickmacross to Castleblaney, - - - - -	13	6,474	924$\frac{6}{7}$
IV. „ Castleblaney to Armagh, - - - - - -	21½	6,772½	967½
TOTAL, DUBLIN TO ARMAGH, - -	85½	52,371½	7,481$\frac{9}{14}$
V. „ Armagh to Portadown, - - - - - -	10⅞	4,524	646$\frac{2}{7}$
VI. „ Portadown to Lurgan, - - - - - -	5¼	2,467½	352½
VII. „ Lurgan to Belfast, - - - - - -	12	6,504	929$\frac{1}{7}$
VIII. „ Lisburn to Belfast, - - - - - -	8	16,000	2,285$\frac{5}{7}$
TOTAL, ARMAGH TO BELFAST, - -	36⅛	29,495½	4,213$\frac{3}{14}$
GRAND TOTAL, DUBLIN TO BELFAST, -	121⅝	81,867	11,695$\frac{2}{7}$

PART I.

We have found that this number, 11,695, may be divided into—

Total Principal Class, . .	7,362	Total Second Class, .	4,333
Probable increase, 100 per cent.,	7,362	Increase at 50 per cent.,	2,166
	14,724		6,499
	6,499		
Total with increase, .	21,223		
Add one-fourth, for posting and private Carriages, . .	5,305		
Add one-tenth, for Parcels .	1,170		
Grand Total, . .	27,698 in one direction		
	2		
Grand Total, . .	55,396 in both directions.		

This number divided by 121⅝, the whole length of the line gives 456 for the average estimate number that would daily pass over every mile of the line, for every day in the year.

With regard to the Western Line, which it has been proposed to carry in the direction of the Royal Canal to Mullingar, we understand that it is intended that the line in question should join the South-Western at a point near to Celbridge: on this supposition we have formed the following table:—

CALCULATION made from the PASSENGER MAP, of the NUMBER of PASSENGERS that would probably travel on a WESTERN LINE of RAILWAY from DUBLIN to MULLINGAR.

Total Distance from Dublin in Statute Miles.	WESTERN LINE	Average Number of Passengers, weekly, in one direction.	Distances between Stations.	Equivalent No. of Passengers moved in one direction, weekly.	Equivalent No. of Passengers moved in one direction, daily.
15¾	FIRST PART.—From the point, 12 miles from the GENERAL POST OFFICE, in DUBLIN, where it would leave the South-Western Line at Celbridge, TO MAYNOOTH.				
	1. Passengers to Maynooth, by Coaches and Cars, - -	566			
	2. Do. do. by Canal (Fly Boats), - -	148			
	3. Do. do. by Canal (Night Boats), - -	252			
		966	3¾	3,622½	517½
19½	SECOND PART.—FROM MAYNOOTH TO KILCOCK.				
	1. Passengers to Kilcock, by Coaches and Cars, - -	474			
	2. Do. do. by Canal (Fly Boats), - -	134			
	3. Do. do. by Canal (Night Boats, - -	242			
		850	3¾	3,187½	455 5/14
40½	THIRD PART.—FROM KILCOCK TO KINNEGAD.				
	1. Passengers to Kinnegad, by Coaches and Cars, - -	244			
	2. Do. do. by Canal (Fly Boats), - -	93			
	3. Do. do. by Canal (Night Boats), - -	193			
		530	21	11,130	1,590
50¾	FOURTH PART.—FROM KINNEGAD TO MULLINGAR.				
	1. Passengers to Mullingar, by Coaches and Cars, - -	119			
	2. Do. do. by Canal (Fly Boats), - - -	73			
	3. Do. do. by Canal (Night Boats), - -	175			
		367	10¼	3,761¾	537 11/28
	TOTAL, WESTERN LINE, -		38¾	21,701¾	3,100¼

Of the above number, 1,637 are canal passengers, and the remainder, 1,463, must be divided into—

Principal Class, . . .	533	Second Class, . .	930
Add 100 per cent., . .	533	Add 50 per cent., .	465
	1,066		1,395
	1,395		

Both Classes, . . .	2,461
Add one-fourth, for post and private Carriages, ...	615
Also one-tenth of present Road Passengers, for Parcels, . .	146
Canal Passengers increased by 25 per ct.,	2,046
Total in one direction, .	5,268
Total in both, . . .	10,536

Which, divided by 38¾ miles, gives a mean of 272 passengers daily on every mile, every day in the year.

In the preceding pages, when treating of the internal carrying trade of the country, we have given an estimate of the merchandise traffic which migbt reasonably be expected on the Southern and Northern Lines. Collecting into one view the estimates botb of traffic and passengers, we have the following table:—

	Miles.	Average Number of Passengers moved over every Mile daily.	Average Number of Tons moved over every Mile daily.	Average Daily Receipts. Passengers at 1¼*d.* per Head per Mile.			Average Daily Receipts. Goods at 2*d.* per Ton per Mile.			Total daily Receipt for Passengers and Goods.		
				£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
South-western Line to Cork, with Branches to Limerick and Kilkenny, - - -	228¾	342	87.37	407	18	11	167	9	10	575	8	9
Northern Line through Armagh to Belfast,	121⅘	456	67.41	288	10	5	56	16	7	345	6	0
Western Line to Mullingar, - - -	38¾	272	—	54	17	6	—			54	17	6

We have not formed any estimate of the probable commercial traffic on the proposed Line to Mullingar, because it would continue to be carried by the Canal: the above table shows that the number of passengers, on such a Line, would fall far below the number on the other two lines. And whatever traffic it might obtain must be almost entirely withdrawn from the Royal Canal.

In a subsequent part of our Report we shall enter into an examination of the merits of the several lines proposed by Irish Joint Stock Companies, and we shall there show that the Line to Mullingar as proposed by the "Great Central Irish Railway Company," could not be attempted without ruin to the speculators; and a repetition of that disastrous competition which, in the case of the two Canals, has caused a loss of about two millions of money.

We shall, therefore, confine our attention, for the present, to the two great Lines to the South and North.

Tbe return on capital which the above receipts would produce forms the subject of a subsequent part of our Report. Until we have shown what tbe expense of constructing and working the lines in question would be, we are not prepared to enter on that part of our inquiry. Supposing, however, for the present, that no difficulties present themselves to the formation of Railways in the direction to which the above calculations refer, and that, on the contrary, as regards the Southern Line, that the country offers unusual facilities for the construction of such a work—that the soil is not only generally good, and the average produce very considerable, but that there are certain districts which this line would traverse, of extraordinary fertility, and others susceptible of great improvement—tben we may safely conclude that if these lines would not furnish an adequate return on the capital expended in their construction, no lines that could be constructed in Ireland would give such a return. And further, if it should appear that the probable receipts are barely sufficient, even with the greatest economy and the most judicious management, to justify the undertaking of these great works, it must likewise be evident, that, when formed, they will require to be protected against the rivalry of other lines. In the present state, and with the present amount of traffic and intercourse throughout Ireland, the competition of rival lines would be altogether ruinous to the speculators, and most injurious to the country. In coming to the above conclusions with regard to the lines indicated on the map, we wish to be understood as speaking only of their general direction; the one towards the south-west, traversing the centre of the southern part of the country, and terminating at Cork; the other inland to Belfast, commencing in a north-westerly direction, and admitting of being afterwards extended from Navan through the centre of the northern portion of the country, to Enniskillen.

Atlas, Map No. 1.

We have as yet shown no reason for following the precise course marked out in the map. That has been in a great measure determined by the features and conformation of the country. We have noticed, in a previous part of our Report, the peculiar facilities which certain geological formations are uniformly found to offer, in Ireland, for such works. Not only are they easily traversed, but they furnish excellent and abundant materials for construction; they are remarkable also for general fertility, and they contain all the elements most valuable for improving and reclaiming land. We shall, therefore, briefly advert to this interesting subject so far as it illustrates these circumstances, and thereby assists in pointing out and determining the most favorable lines.

4. GEOLOGICAL STRUCTURE OF IRELAND.

If we look to the map of Europe, we find Ireland stretching westward into the Atlantic Ocean beyond all other lands; and from its insular position, and its great exposure, on the north, west, and south, to the Atlantic wave, its coast, as might be expected, is in many parts indented by deep bays, protected by jutting promontories, which have hitherto withstood the fierce assaults to which they are exposed; and these bays and promontories are most numerous and remarkable on the south-west coast, that being the point of the prevailing winds.

It is remarkable, that the rock which forms the bed or bottom of the greater number of these deep bays and estuaries, consists of the secondary, or carboniferous limestone, while the projecting promontories situated to the north and south of each, are composed, for the most part, of primary or transition rocks, and particularly of granite, mica slate, quartz rock, greywacke, and old red conglomerate.

Though the geological structure of Ireland is similar to that of England, still the relative geographical position of the different rocks is essentially different. In England, the mountain ranges, consisting of the primary and transition classes, are situated near the west coast, and the newer strata are successively accumulated on each other to the east and south; in which directions the country is comparatively flat. In Ireland, on the contrary, the coast is for the most part mountainous, while the interior is flat, and rarely presents hills of considerable elevation. Thus, we find the primary mountains of Antrim, Derry, and Donegal, occupying the north and north-west coasts; those of Sligo, Mayo, Galway, and Kerry, the west and south-west. The slate districts of Cork and Waterford form the south and south-east; while the mountains of Wicklow, Louth, and Down are situated on the east coast.

These mountain tracts rarely extend more than twenty miles inland; and we find the interior, with trifling exceptions, composed of flat or gently swelling grounds, covered by a rich and fruitful soil.

This peculiar conformation of the surface has been the origin of the great number of rivers with which the coasts abound; they have their sources in the neighbouring mountains, whence they flow in short but rapid courses directly into the sea.

The Shannon forms the most striking example of the rivers of the interior, flowing slowly through the flat country. This river has its source in a

PART I. limestone cavern, situated in the Valley of Lough Allen, in the county of Cavan; it issues from a circular gulf, about fifty feet in diameter, and at once assumes the character of a considerable stream.

Lough Allen, situated five miles to the south of this source, is generally considered to be the head of the Shannon, and is the point at which its navigation terminates. This lake is elevated but 160 feet above the level of the sea, while the course of the river to the tide-way at Limerick, is 140 miles in length, which gives an average fall of but 1 foot 2 inches in a mile; but this average fall, trifling as it may appear, is not equally distributed, as the greater portion of it, amounting to 98 feet, takes place between Lough Derg and Limerick, a distance of but 15 miles, leaving a fall of only 62 feet between Lough Allen and Lough Derg, in a distance of 127 miles, which is rather less than six inches in a mile.

There are several other rivers which have their sources in the central districts of Ireland, but they are insignificant when compared with the Shannon. They all exhibit the same sluggish character, and when the slow current of the water is interrupted by any impediment, have the same tendency to flood the flat country on either side for a considerable extent.

Exclusive of the tributaries to the Shannon, namely, the Boyle River, the Suck, the Camlin, the Inny, and the Great and Little Brusna, the most important rivers of the interior are the Barrow, (which takes its rise in the Slieve Bloom Mountains,) the Boyne, the Blackwater, and the Little Barrow, the latter having their sources in the Bog of Allen, in the county of Kildare, which in this part forms the summit of the flat country between the Irish sea and the Valley of the Shannon.

This bog does not in any part exceed the height of 300 feet above the level of the sea, while the summit level of the Grand Canal, which passes through the centre of it, is about 270 feet above the mean tide level in Dublin Bay.

The peculiar flatness of the interior of Ireland has probably been the cause of those vast accumulations of alluvial matter, composed of clay and limestone gravel, which in the form of low but steep ridges of hill, occur so abundantly throughout the middle districts, and which are generally known by the name of Eskers. These ridges of limestone gravel probably originated at a period when the country was either wholly or partially submerged, from eddies formed by undulations in the surface.

It would be unsuitable, in this place, to enter into any lengthened description of the crystalline and schistose mountain districts, which nearly surround the island, and the more so, as Mr. Griffith has supplied us with a condensed outline of the Geology of Ireland (Appendix, No. I.)
Atlas, Map No. 5. to accompany his Geological Map. We shall therefore confine our observations to those points which bear upon the subject referred to us, and which relate more to the facilities which certain rock districts afford for the construction of common roads, and Railroads, than to the scientific description of the composition and specific characters of each variety of rock; at the same time, we shall allude generally to the characteristic features of the geology of the country, and to the nature and value of its mineral products, particularly of its metallic and coal mines.

Atlas, Map No. 5. If we look to the Geological Map of Ireland, the great extent of the blue colour, which indicates the position of the carboniferous or secondary limestone, at once attracts attention, and it will be perceived that the different tints of red and grey which occur near the coast, and which represent the localities of the crystalline and unstratified, and of the older sedimentary rocks, are generally interposed between the limestone and the coast.

The characteristic feature of the limestone country is that of flatness; it presents few hills of considerable elevation, and the soil, with the exception of the boggy districts, is unusually fertile. In many parts where the limestone strata are arranged in nearly horizontal beds, most valuable quarries have been opened, and abundance of stone of very large dimensions can be procured suitable for every variety of architectural design; some of the more crystalline limestone beds are susceptible of a high polish; and beautiful marbles of various tints, as black, black and white mottled, and red, yellowish, and bluish greys, occur abundantly in different places, and more particularly at Kilkenny, Limerick, Galway, Cork, King's County, Roscommon, and Armagh. In some of the schistose districts valuable beds of fine-grained roofing slate have been discovered, and several extensive quarries have been opened, which are conducted with spirit and success. The most valuable slate quarries are situated in the county of Tipperary, on the banks of Lough Derg on the Shannon; at Glenpatrick, south of the river Suir, in the county of Waterford; and at Valentia Island, on the west coast of the county of Kerry. Good veins of slate also occur to the east of Strangford Lough, in the county of Down, and in some parts in the counties of Armagh, Monagban, and also in the counties of Wicklow, Wexford, and near the south coast of the county of Cork.

In respect to metallic mines, veins, both of copper and lead, have been discovered, and partially worked in many parts of the primary slate districts of the counties of Donegal and Galway, and in the granite-slate districts of the counties of Down, Armagh, Monaghan, Wicklow, Wexford, Waterford, Cork, and Kerry; also in different parts of the great central limestone district.

At present few of these metallic mines are in operation. Among the copper mines the most important are those of the Vale of the Ovoca, in the county of Wicklow; of Bonmabon, county of Waterford; and of Allihies, near Castletown, Berehaven, in the county of Cork, all of which are now at full work; the two latter are highly productive, and give employment to a considerable number of miners and labourers.

The lead mines of Ireland have not latterly been prosperous, and few are at present at work; the most extensive are those at Conlig mountain, near Newtownards, in the county of Down; of Derrynoose, in the county of Armagh; of Lugganure, in the county of Wicklow; and in the limestone district of the county of Clare, at Ballyhicky near Ennis.

In respect to the coal mines, if we except those which occur near Ballycastle, on the north coast of the county of Antrim, the whole are situated within the limits of the carboniferous or secondary limestone country, and the strata which accompany the coal affect the form of great mineral basins, and rise to considerable elevations above the limestone which surrounds them, and on which they rest.

In Ireland coal occurs in seven distinct localities, which have been called the Leinster; the Slieve Arda, or Tipperary; and the Munster, situated to the south of Dublin; and the Monaghan, the Connaught, the Tyrone, and the Antrim, to the north of it. The coal consists of two distinct species, namely, non-flaming coal, or anthracite, and bituminous or blazing coal. The first, with the exception of two beds of trifling importance which occur in Antrim, are confined to the coal districts situated to the south of Dublin; while the northern contain bituminous or blazing coal.

The Leinster Coal District.—We shall commence our review with the Leinster coal district, which is situated in the counties of Kilkenny, Carlow, and Queen's County.

The well known property of Kilkenny coal, namely, that of burning slowly without either flame or smoke, has obtained for it, among mineralogists, the name of anthracite, or non-flaming coal. It is also called mineral charcoal, from its containing from 94 to 96 per cent. of pure carbon.

This district contains seven workable beds of coal, arranged in regular succession, one above the other. The collieries, particularly those in the neighbourhood of Castlecomer, in the county of Kilkenny, and of Doonane, in the Queen's County, have been worked for upwards of a century, and now annually produce about 120,000 tons of coal and culm. The coal is used for domestic purposes and malting, and the culm exclusively for burning lime.

The upper beds, which are the purest, are now nearly exhausted; but three of the lower beds, which are very extensive, have never been worked, excepting near the out crop, where they occur near the surface, and, consequently, this district still contains an abundant supply of coal and culm.

The Slieve Arda, or Tipperary Coal District.—The general circumstances of this district are similar to those of the Leinster. It forms a ridge of hill country of considerable elevation above the limestone which surrounds it, and on which it rests.

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This district, as far as it is at present known, appears to contain but three beds of coal, the lowest of which is only nine inches in thickness, but the second and third are each two feet thick. The coal is of good quality, but not so dense as the three foot coal of the Leinster district.

The principal collieries are situated at Colebrook, and at Coolquil in the neighbourhood of Killenaule. The latter is conducted with judgment and considerable success by the Mining Company of Ireland. The large coal of this, as well as of the Leinster district, is used for domestic purposes and for malting, and the small coal and culm for burning lime.

Atlas, Map No. 5. By a reference to the Geological Map it will be seen, that the line of the Main Southern Railway, which we recommend, passes through the midst of the limestone valley situated between the Slieve Bloom Mountains and the Leinster and Tipperary coal districts. By a proper construction of the grate, it is probable that the pure though dense non-flaming coal of these districts may be used with advantage for locomotive engines. When ignited it yields no smoke, and consequently it possesses one of the desired qualities of coke; and, at the same time, it is much more durable than any other variety of coal.

The Munster Coal District.—This district is, perhaps, the most extensive in the British empire; it occupies considerable portions of the counties of Clare, Limerick, Kerry, and Cork; and coal mines have been discovered, and partially worked, in all those counties.

The coal is usually of a slaty structure, and much softer than that of Tipperary or Kilkenny; in consequence, it is almost exclusively used for burning lime.

In the county of Clare beds of anthracite, or slaty coal, have been discovered at Moy and Seafield, on the west coast, and on the banks of the Shannon near to Labasheda Bay, where considerable workings have been made, though the bed of culm is only 14 inches in thickness.

Thin beds of culm have also been worked in the neighbourhood of Loughill and Newcastle in the county of Limerick; and in the vicinity of Tralee and Listowel, in the county of Kerry; but the barony of Duhallow, in the county of Cork, contains the thickest and most valuable coal beds of the Munster district. The principal collieries are situated on the north bank of the river Blackwater; and at this moment extensive works are being carried on, particularly at Dromagh and Gurteen collieries, ten miles west of Mallow.

From the extent of coal already known in the southern portion of the Munster coal district, no doubt can be entertained of its capability of supplying the country with abundance of culm, suitable for burning lime for centuries to come. This circumstance is of the utmost importance to the agriculturists of the south of Ireland, who find lime to be the best manure for raising corn crops, and particularly wheat, the cultivation of which has been only introduced into that district within the last few years.

The Monaghan District.—We now proceed to the consideration of the bituminous coal districts, situated to the north of Dublin, and shall commence with that of Carrickmacross, in the county of Monaghan.

In this locality the coal formation rests on a small tract of carboniferous limestone, which is insulated in the central greywacke slate district. Hitherto, though many trials have been made, no coal worth working has been met with; but one bed of 14 inches, one of 1 foot, and several of inferior thickness have been discovered.

Connaught Coal District.—This district is situated on the east and west sides of Lough Allen, near the source of the river Shannon, and comprehends portions of the counties of Roscommon, Leitrim, and Sligo. It consists of a group of hills of considerable elevation, having steep acclivities and flat summits, and the strata which accompany the Coal rest directly on secondary limestone.

The Coal occurs in detached basins, near the summits of some of the hills; it has never been wrought extensively, and as there is but one workable bed which, in some localities, is three feet in thickness, and in others less than two feet, it is not probable that many extensive collieries or manufactories can be successfully established in that district; and consequently, we cannot expect it will at any period produce an abundant supply of fuel for distant markets. The Arigna Iron works, the only manufactory of that kind hitherto erected in Ireland, have been lately at work, and cast iron of the best quality can be made there, at a moderate expense. The Coal though thin, is of excellent quality, being at least well adapted for the smelting of iron; the ironstone is peculiarly rich, and limestone is abundant in the neighbourhood, and it is to be hoped that these works, on which public expectation has been so often raised and as often disappointed, will at length become profitable to the speculators, as well as advantageous to the labouring population of the surrounding district.*

Tyrone Coal District.—This district, which is situated to the north of Dungannon, in the county of Tyrone, though very small, is much richer—that is, it contains a greater number of valuable beds of coal—than any other in Ireland. At present nine workable beds are known, which vary from three to nine feet in thickness. The first or lowest bed has been worked at Drumglass colliery, one mile north of Dungannon; it is slaty and impure, and varies from two to three feet in thickness. Above it is a bed of coal four feet six inches thick, of excellent quality. Within the last 14 years very extensive workings have been made on this bed by the London Hibernian Mining Company; but the speculation has not hitherto proved remunerative.

At Coal Island, three miles north of Drumglass, six beds of coal have been discovered, and worked with various success within the last century; and a very deep pit is now being sunk by the Coal Island Coal Company at Annagher, on the dip of the uppermost bed of coal, which is nine feet in thickness. Unfortunately, the stratification of this district is so much disturbed and dislocated by faults, that the extent of coal commanded by each pit, is usually very much circumscribed; and this circumstance, when coupled with the soft and incoherent nature of the beds of shale and sandstone which accompany the coal, has added so much to the difficulty and expense of working it, that the mining adventurers have rarely derived any considerable profit from it.

The coal of the Tyrone district is very similar to that of Ayrshire. It burns swiftly, and leaves a considerable residuum of yellowish white ashes.

Antrim Coal District.—This district is situated on the north coast of the county of Antrim, close to Fair Head, and occupies the country both to the east and west of that headland.

The collieries have been wrought at a very remote period, and possibly they may be among the most ancient of the British empire.

To the west of Fair Head this district appears to contain but one workable bed of coal, which is four feet six inches in thickness. It is visible on the face of the magnificent cliff which extends westward from Fair Head nearly to Ballycastle; the strata dip to the southward at a small angle, and the coal has been wrought by means of adits, or galleries, driven inwards from the face of the cliff, at the level of high water mark. As the coal generally crops out at a considerable elevation above the sea, some of those levels were driven upwards of 300 yards in length before they reached the coal on the dip.

At Murlough Bay, to the south-east of Fair Head, the strata which belong to the coal formation appear to be quite distinct from those to the westward. Here instead of one, there are six beds of coal, varying from one to two feet six inches in thickness, four of which consist of bituminous coal, and two of simple carbonaceous or non-flaming coal; but it is to be observed, that the latter beds occur one immediately above, and the other below an apparently intruded mass of columnar trap, seventy feet in thickness.

The principal workings of Murlough Bay, have been made on the two lower beds of bituminous coal, and the upper bed of non-flaming coal.

At present no coal is raised in this district, owing partly to the difficulty of working to the dip of the old excavations, and partly from the want of a safe harbour for shipping. At the same time it may be remarked that the extent of coal which remains unwrought must be inconsiderable.

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* The Arigna Company are in possession of the most extensive and valuable Coal Field in the district.

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It will be perceived from the foregoing, that Ireland contains abundance of valuable stone, marble, and slate quarries, many of which are at present in successful operation. That the metallic mines now at work, though limited in number, are very prosperous, and should the prices of copper and lead increase, much more extensive works will probably be undertaken. In respect to the bituminous coal mines generally, of the northern counties, it may be said that they are inferior both in productiveness and purity of coal to those of Great Britain, but that the anthracitous or non-flaming coal districts situated to the south of Dublin, are sufficiently extensive, and contain abundance of that peculiar species of coal which though less agreeable than the bituminous for domestic use, is most valuable in all cases where a strong and steady heat is required; and, as already mentioned, it may possibly be made available for the locomotive engines of the southern Railways.

Superior facilities for the construction of Railways, afforded by certain Districts as compared with others.

Atlas, Map No. 5. In the progress of our investigation we have derived much advantage from the possession of the Geological Map; it presented to us at one view the relative positions of the most fertile and populous districts, and the directions through which Railways might be carried without incurring any material engineering difficulties; and we have, in every instance, taken advantage of the information thus supplied; we found that the lowest and most level lines through the country, are almost exclusively confined to the carboniferous limestone, and that the moment we passed the boundaries of that rock, we encountered difficulties which it was desirable to avoid. If we select, for example, the central limestone district which extends from Dublin Bay on the east coast, to Galway on the west, we find that the summit level of the Grand Canal, situated 25 miles to the west of Dublin, is elevated but 270 feet above mean tide level in Dublin Bay, equal to about 11 feet in a mile; and that the summit level of the Royal Canal, which crosses the country ten miles to the north of the Grand Canal, and 45 miles west of Dublin, is elevated but 315 feet above the level of the sea, equal to 7 feet in a mile.

The fall in the Shannon, in a north and south direction, between Tarmonbarry and Banagher, is but 8 feet in a distance of nearly 40 miles.

The country to the westward, between the Shannon and Galway, and in a north-west direction between that river and the great Lakes of Lough Corrib and Lough Mask, a distance of about fifty miles, presents a limestone tract similar in character to that to the eastward, but the summit is less elevated, being 250 feet above mean tide level in Galway Bay.

Similar examples might be adduced to show that the limestone of the more southern districts, extending through the counties of Limerick, Kerry, Tipperary, and Cork, preserves the same level character; and although summits intervene between the valleys of the several rivers, still these summits are so low, and the ascents so gentle, that to an inexperienced eye the whole country appears to consist of one uninterrupted plain.

Atlas, Map No. 5. With the knowledge of these facts, it becomes evident that the Geological Map of Ireland will serve as a valuable guide in determining the best lines for improved internal communication, whether by ordinary roads, by railroads, or canals: for every variation from the blue colour on the map indicates not only a change in the character and composition of the rock, but also the commencement of a hilly or mountainous tract, through which no internal communication can be made without encountering steep ascents or descents, and other engineering difficulties; in addition to which it may be observed, that the whole of the populous towns of the interior of Ireland are situated in the limestone country, and nearly the whole of the rich arable and pasture lands are confined within its limits. It is true that this valuable district is encumbered by vast tracts of bog, at present in a state of nature, and nearly inaccessible; but no doubt these bogs, as well as the flooded lands on the banks of the rivers, will hereafter be drained and improved, and become valuable appendages to the adjoining uplands.

Nature and Productiveness of the Soil of different Districts, and their relative Capabilities of Improvement.

The nature of the soil of any district depends in a great measure on the composition of the surface rock of the surrounding country, and this is particularly the case in mountain tracts, where foreign matter rarely occurs to any extent, except in the bottoms and sides of deep valleys.

In Ireland, as already mentioned, the surface of the limestone in the flat central districts is, in many parts, covered by a thick coat of diluvial matter, consisting of clay and rolled limestone, and this covering is not confined altogether to the limestone country; on the contrary, detached gravel hills, composed of similar matter, frequently occur on the bases and sides of mountains, at elevations of upwards of 600 feet above the level of the sea; but these partial deposits, though valuable as manure, rarely affect the local character of the soil, which is chiefly composed of the disintegrated rock of the immediate neighbourhood.

Speaking generally, the most valuable soils of Ireland are contained in the limestone district, which occupies two-thirds of the country; in those localities where the clayey diluvial gravel is interposed between the surface and the rock, the soil is unusually wet and clayey; so much so, as to become impervious to water. Hence has arisen the tendency to the growth of the Bog Moss (*Sphagnum Palustre*) and other aquatic plants, which have gradually produced the bogs that occur so abundantly among the Eskers or gravel hills of our central districts.

In those parts of the great limestone district to which the gravel deposits have not extended, the soil is rich and is capable of producing any kind of agricultural crop; but in these fertile plains less exertion has been displayed than in other parts of the country, where the soil is of inferior quality; but where, owing to the industry of the people, the quantity and quality of the crop per acre is superior to that produced on the rich calcareous loams. It should be observed, that these loams produce, spontaneously, abundance of grass of good quality, which is not the case in the friable soils of the slate or granite districts; hence the landed proprietor or rich farmer of the limestone country, is induced to stock his land with grazing cattle, while those of the hill districts find their advantage in tillage, and though working on an inferior soil, raise a larger quantity of food, and live in greater comfort and abundance than their more indolent neighbours. We may select as an example, the rich and extensive plains of the counties of Meath and Westmeath, where nothing is looked to but grazing and fattening cattle upon the natural produce of the soil, unaided for the most part by green crop husbandry; while the farmers of the slate and granite districts of the counties of Down, Armagh, Louth, Wicklow, and Wexford, produce excellent corn and green crops, and the most improved system of husbandry is now being gradually introduced.

It is true, that in some portions of the limestone tract we find better farming than in others, but were the lands of the Leinster district, on the whole, as well cultivated as those of the north-east coast, the produce would be more than doubled, and the condition of the people proportionably improved.

Though the soil of the slate districts of the counties of Waterford, Cork, and Kerry, is in many respects similar to that of the north and east coast, still, partly owing to the indolence of the people, and partly to the tendency of the surface to produce good natural grasses, arising from the mildness and humidity of the climate, the farmers depend for the payment of their rents more upon the produce in butter, than upon the cultivation of corn and green crops. In fact, farming by a regular rotation of crops has rarely been attempted in the southern counties beyond the enclosures of demesnes; but it is satisfactory to observe the great interest in agricultural improvement, which at this moment pervades the country from north to south. Local farming societies have been formed in every direction, composed of the farmers as well as of the gentry, and the friendly intercourse created by these meetings, has tended not only to excite a general interest in agricultural improvement, but to promote those kindly feelings between tenant and landlord which are so beneficial to both.

It is true, as compared to England and Scotland, that the Irish farmer, even

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of the north-eastern district, has yet much to learn; but still, great improvements have taken place within the last ten years; and during that period the produce in corn has increased more than fifty per cent., and that of butter, cattle, pigs, &c., has also increased, though not to an equal extent.

5.—SELECTION AND DESCRIPTION OF CERTAIN LINES OF RAILWAY WHICH, FROM A CONSIDERATION OF THE VARIOUS CIRCUMSTANCES ABOVE ENUMERATED, APPEAR BEST CALCULATED TO PROVE BENEFICIAL TO IRELAND, AND TO AFFORD THE GREATEST RETURN ON THE CAPITAL EXPENDED.

On the various grounds stated in the preceding pages, and which we shall here recapitulate—the amount of population which would be benefitted—the condition of that population, and their power to profit by the advantages of Railway communication; the industry and comparative commercial activity prevailing among them; the comparative amount of traffic and number of passengers; the great towns which would be connected by the least extent of Railway; the singular fertility of many of the southern districts; their capabilities of great and extensive improvement; the facilities which they afford for the construction of Railways; the importance of connecting Dublin with Cork, the commercial capital of the south,—with Limerick, Waterford, and Kilkenny; and with Belfast in the north; and farther, on the ground of not interfering with or injuring any existing canal or river Navigation, we have come to the conclusion, that the two great lines which would open the country in the most advantageous manner, confer the most extensive accommodation at the smallest outlay, and afford the greatest return on capital, would be the following lines, of which we shall first describe the general direction, and afterwards give a detailed account, founded on the Reports of the Engineers who surveyed them.

Plans, Index Map, Part I.

First, then, we are of opinion, that the main line to the South-west, should pass near Maryborough; there, or a little beyond it, throw off a branch to Kilkenny; thence continue its south-western course, through a very easily traversed country, by Thurles, to Holycross; there throw off a second branch to the right, which, sweeping close round the Keeper mountains, should run through the rich district of the Golden Vale, to Limerick; while the main branch, continuing its course through Cashel, and winding round the base of the Galtees Mountains, close by Cahir, should pass through Mallow to Cork. At Mallow the line will be within 40 miles of Killarney; and when it is borne in mind how much the profits of a Railway depend on the conveyance of passengers, and how great, in all probability, would be the resort to that celebrated spot of the class of passengers seeking recreation or pleasure, when London shall be brought within 20 hours of Dublin, the importance of such an approximation to Killarney becomes obvious. There is yet another strong reason for selecting Cork as the terminus of the great South-western Line; if a frequent and regular steam communication with America, from Great Britain or Ireland, shall be established, it appears to us that Cork, either as a steam packet station or a port of call, would be the most convenient and suitable. We merely advert to this important subject here, as we shall have occasion to return to it in a subsequent part of our Report. It will also be observed, that this line would much facilitate the intercourse between Galway and Dublin. The distance by the present Coach Road is 132 miles, and the journey is performed in 14½ or 15 hours. The proposed Railway would enable the traveller to reach Borris-in-Ossory, a distance of 65 miles in 3¼ hours, when he could complete his journey to Galway, by Portumna, a distance of 74 miles, in 8 hours; being a saving of time of 3¼ hours, and travelling only 7 miles more than by the present Mail Coach road.

As part of the same combination, Limerick should be connected with Waterford by a branch crossing a little to the south of Golden, and passing through Clonmel and Carrick, to Waterford; and thus a Railway communication would be completed between the towns of Dublin, Cork, Limerick, Waterford, Kilkenny, Clonmel, Tipperary, Cahir, Thurles, Mallow, Maryborough, &c.

Second, with respect to the northern districts, we are of opinion, that the Main Line should run to Navan, whence a branch might be easily carried by Kells and Virginia, to Cavan and Enniskillen. From Navan, the Main Line, continuing its course to the north, should pass by Castle-blaney to Armagh, and thence to Belfast.

Details respecting the above Lines.—From the facilities which the limestone districts of Ireland generally offer for the construction of Railways, it appeared probable, that the best and most direct line for a Railway between Dublin and Cork, with branches to the cities and towns above-mentioned, would pass through the limestone valley of the Queen's County and County of Tipperary, which is bounded on the west by the Slievebloom and Keeper Mountains, and on the east by the hills of the Kilkenny and Tipperary coal districts; and, in consequence, we directed Mr. Vignoles, Civil Engineer, to make a rapid survey of the country in this direction, and to report to us, generally, as to the practicability and expense of effecting the objects proposed.

The result of this preliminary examination was so favourable, that we directed Mr. Vignoles to make a survey and sections of the lines in sufficient detail to enable him to determine on the several gradients which the nature of the country would afford, and at the same time, to form an estimate on which we might venture to report with some confidence, as to the probable cost of completing them; and it is gratifying to us to be able to state, that he has executed the task entrusted to him in a very satisfactory manner.

In the progress of the investigation, Mr. Vignoles had occasion to make several trial surveys in different parts of the line, to enable him to select that which was most desirable, and in doubtful cases the line adopted was determined on by us.

The gradients also, on the regulation of which so much depends, both in respect to the original cost, and the ultimate value of the Railway to the country, have been carefully gone over by one of the Commissioners in conjunction with the Engineer, and, in consequence, several material alterations were made, which have much lessened the amount of the original estimate, without affecting, in an important manner, either the rapidity of intercourse, or the commercial advantage.

South-West Line.—The point selected for the terminus of the Southern Lines, in the City of Dublin, is on the bank of the River Liffey, close to Barrack-bridge.* This point has been determined on after much consideration; it is but 1¼ miles distant from the General Post Office, in Sackville-street; and in a situation from whence, if thought advisable at a future period, the Railway may be connected with that already completed from Dublin to Kingstown: Mr. Vignoles has prepared, and presented to us, a Plan for such an extension; it accompanies the Report, but we wish it to be clearly understood, that we do not recommend its present adoption.

Plan No. 1,* Part 1.

From Barrack-bridge the Railway has been laid out, in a southern direction, on the right bank of the Liffey, through Palmerstown, and close to Lucan. Between these points the line must necessarily pass through several small demesnes, but, fortunately, without interfering with either the approaches or ornamental grounds, with the exception of the demesne of Palmerstown, which will be so much injured as to render its purchase a matter of necessity; but having ascertained that a very material saving in the cost of embankment and excavation, would be made by adopting the river line in preference to a higher level, we at once determined on it, trusting at the same time to the public spirit of the proprietors of the demesnes interfered with, that no unreasonable objections or claims would be made.

From Lucan the line takes a south-western direction, passing near to the towns of Sallins, Rathangan, Monasterevan, Portarlington, and Maryborough. Three miles beyond Maryborough, where the line crosses the summit of the country, between the valleys of the Barrow and the Nore, it is proposed to form a branch to the city of Kilkenny, by the towns of Abbeyleix and Ballyragget.

The distance between Dublin and the commencement of this branch is

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* Sometimes called Bloody-bridge.

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52½ miles, and thence to Kilkenny is 26½ miles, making a total length, from Dublin to Kilkenny, of 79 miles.

From the Maryborough summit, the line has been continued through the limestone country to the road from Borris-in-Ossory to Rathdowney, which it crosses at the distance of 66 miles from Dublin, and 3 miles from Borris-in-Ossory on the Limerick road; and this point, which will serve as a station for passengers and merchandise from the towns of Roscrea, Borris-in-Ossory, Castletown, Mountrath, and the districts surrounding them, must eventually become a point of very general resort.*

From the road to Borris-in-Ossory the line pursues its south-western direction, passing near to the towns of Rathdowney, Templemore, and Thurles, to Holycross, in the county of Tipperary, where it is proposed that the line to Limerick should diverge.

This line has been laid out with great care, skirting as close as levels would permit to the south-eastern base of the range of the Keeper Mountains, and thence, without encountering any difficulty, proceeding in a direct line to the city of Limerick.

The distance by the proposed line of Railway between Dublin and Holycross is 89¾ miles, and between Holycross and Limerick, 35¾ miles, making a total distance between Dublin and Limerick, of 125½. This distance is only six miles longer than the direct post road between those points, a circumstance we deem very satisfactory, when it is considered that the proposed Railway communication between Limerick and Dublin will be effected by a divergence from the Cork line, of only 35¾ miles in length.

From Holycross the Main Cork Line proceeds in a southern direction to Cashel, and thence to Marhill, near New Inn, in the county of Tipperary, at which point it is intended that the line to Clonmel and Waterford should commence; but to complete a direct Railway communication between Limerick and Waterford, it is also proposed that this branch-line should be continued in a western direction, from Marhill towards Limerick, and crossing the River Suir at Golden, join the line from Holycross to Limerick, at Donagbill.

The distance from Marhill, by Golden, to Donagbill is 13 miles; and by adopting this arrangement, there will be a saving of distance between Limerick and Waterford, of 14½ miles; without it, all the traffic from Limerick to Waterford must necessarily pass from Donaghill, round by Holycross, to Marhill, in order to reach the commencement of the Waterford Line.

Between Marhill, on the Cork Line, and the city of Waterford, we have not thought it necessary to make a detailed survey further than Clonmel, between which point and Waterford it has already been ascertained, by a careful survey, that a Railway can be made at a moderate expense. From our Passenger and Commercial Traffic Maps, it appears that the present intercourse between Waterford and Clonmel is very considerable, and though perhaps not sufficient to insure the success of a Railway speculation, were it limited to those places, still, when to this important local traffic the rapid communication between Waterford and Limerick, and Waterford, Dublin, and Cork are added, we apprehend that few parts of the general system of Railway communication, which we recommend, will be found more remunerative than that between Waterford and Clonmel.

The distance between Dublin and Marhill is 104¼ miles, and from thence to Waterford, 37 miles.

Continuing in a southern direction from Marhill, the Cork Line follows the valley of the river Suir to Cahir, situated at the eastern extremity of the Galtees Mountains, at which point, owing to the physical structure of the country, it has been necessary to adopt a south-western course, passing through the narrow valley interposed between the Galtees and Kilworth Mountains, whence it continues by Mitchelstown to Kildorrery, and thence to the town of Mallow, situated on the river Blackwater.

The valley of the river Blackwater, at Mallow, offers a very favorable line for the extension of the Railway in a western direction, to Killarney, distant 40 miles. No doubt, during the summer season, this line would be much resorted to by visitors to the lakes, and at the same time it would connect the extensive culm collieries situated immediately to the north of the

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* It is also probable, that passengers from Galway, Loughrea, and the southern portion of the county of Galway, and from Parsonstown and its neighbourhood in the King's County, will join the Railway near Borris-in-Ossory.

Blackwater, and 14 miles west of Mallow, with the interior of the limestone country, where fuel, and particularly culm, is much required for burning lime, both for building and agriculture.

But we do not recommend the execution of this branch at present; we merely allude to it as one which it may be desirable to construct at a future period, and which would add considerably to the traffic on the Main Trunk, both in passengers and merchandise.

From Mallow the main line takes a direct southern course to Cork, and necessarily crosses a ridge of slate country, which intervenes between the limestone valleys of the river Blackwater, at Mallow, and the river Lee, on which Cork is situated.

Here experience fully confirms the remarkable circumstance to which allusion has been made, in treating of the Geology of the country, that throughout the whole of the lines which have been described, no engineering difficulties worthy of notice occur, as long as we continued in the limestone country; but the moment we attempt to cross the slate district, situated between Cork and Mallow, we encounter an elevation of 222 feet in 7 miles 3 furlongs, which must be overcome by adopting steeper gradients than those required for any other part of the lines we have described, and which never leave the great limestone district of the interior of the country. Owing to this favorable nature of the ground, we have not found it necessary to cross any of those high table lands, which can only be traversed by tunnelling; but by allowing the lines to undulate to a certain degree with the surface of the country, according to the revised system of gradients, all deep cuttings have been avoided. Hence, the several Railways which we recommend for the south of Ireland, can be formed at the comparatively moderate expense stated in the Estimate contained in Mr. Vignoles's Report, Appendix A, No. 1.

Having thus briefly described the Lines of Railway by which we propose to connect the cities of Cork, Limerick, Waterford, and Kilkenny with Dublin, we think it desirable to notice those lines which have been brought forward and surveyed at the expense of Joint Stock Companies, and were also intended to connect some of the same points with Dublin.

We shall commence with the line from Dublin to Kilkenny, for the execution of which an Act of Parliament was obtained during the last session. Atlas, Map No. I.

This line commences at Kilmainham, near Dublin, at the distance of about 2½ miles from the General Post Office, and taking a higher level, continues for the first 17 miles in a line nearly parallel to that adopted by us; it then diverges to the southward, and crosses the Grand Canal at Sallins, 18 miles from Dublin; afterwards it traverses the Curragh of Kildare, then falls into the valley of the Barrow, and crosses that river at Athy; from this point it follows the right bank of the Barrow as far as Leighlinbridge, where it leaves it, and skirting the base of the hills of the Kilkenny coal district, takes a nearly north-western course to Kilkenny.

This line has been laid out with great judgment, and its gradients are very favorable, but we strongly object to it as the Main Trunk to the south of Ireland:

1st. As a line to Cork, it is 4 miles longer to Cahir (which is a common point) than that by Maryborough. 2ndly. The communication from the city of Limerick to Dublin, by any connexion with it, excepting by a branch line diverging at a short distance from Dublin, is quite out of the question.

Thus, as a Trunk Line to the south, we think it deficient in the most important points—the objects sought being the best communication, consistent with economy, between the leading cities of Dublin, Cork, Limerick, Waterford, and Kilkenny.

Adopting this as a principle, it becomes evident that the most economical Line for connecting Kilkenny with Dublin will be by the branch from the Maryborough Summit, which, as already mentioned, is but 26½ miles in length, in preference to making a line for the entire distance from Kilkenny to Dublin of 73½ miles.

It is true that the line to Kilkenny, by the Valley of the Barrow, &c., is 5½ miles shorter than that recommended by us, but taking into consideration, the great expense of a line of 73½ miles for the sole object of connecting Kilkenny with Dublin, we are of opinion that this line is decidedly objectionable. Besides, this Railway would interfere in some degree with the Barrow Navigation, though perhaps not materially, as there is no passenger traffic on the latter, and it is probable that heavy goods will at all times be carried cheaper by water than by Railway.

At the same time we are fully alive to the importance of a direct Railway communication through the rich and populous valley of the Barrow, which contains the towns of Athy, Carlow, Bagnalstown, and Leighlinbridge, and which would greatly facilitate the intercourse between the city of Dublin and the south-eastern portion of the county of Wexford, including the towns of Wexford, Enniscorthy, and Ross. The present post road from Dublin to Enniscorthy and Wexford, passes through the town of Tullow, situated but eight miles to the east of Carlow; consequently, all passengers could, without difficulty, join the Railway at Carlow, and by these means reach Dublin two hours sooner than by the present road, and at a much cheaper rate; the passengers from Ross, by joining the Railway at Leighlinbridge, would save upwards of four hours, making the journey in eight instead of twelve hours. Under these circumstances, though we consider the Kilkenny Line highly objectionable, as the Main Trunk to the South and South-west of Ireland, and also as a distinct line from Dublin to Kilkenny, we think, that it might be desirable to connect it as a branch, with the Main Southern Line recommended by us, at some point in the neighbourhood of the town of Kildare. Should this plan be finally adopted, a change might be made in our Main Line between Sallins and Maryborough, so as to pass a little to the northward of the town of Kildare; from whence the country is favorable for the construction of a Railway to or near to the town of Athy, where it would join the Kilkenny Line, as at present laid out.

By this arrangement the Railway distance from Dublin to Kilkenny would be about 76 miles, or 2½ miles longer than the original line; but the length of the branch from Kildare would be but 45½ miles, instead of a line of 73½ miles.

This view is thrown out for consideration. The Kilkenny Railway Company having already obtained an Act of Parliament for their line, may determine to persevere and complete it for the whole distance from Dublin to Kilkenny. Should they do so, we are of opinion, that the Main Southern Line from Dublin, recommended by us, possesses so many important local advantages over the Kilkenny Line, that we should strongly recommend its adoption, notwithstanding the loss which must ensue from their running parallel to each other for the first 18 miles from Dublin; a loss which would be very injurious to the Main Southern, and absolutely ruinous to the Kilkenny Line. We have no hesitation in saying, that any proposal to prolong the latter, in order to substitute it for a Main Trunk Line to the South-west, is inconsistent with the general interests of the country, and directly opposed to those of several extensive and most important districts.

For reasons already given, we deem it highly inexpedient that the Main Trunk Line into Dublin should be placed under the control of any Company whose pecuniary interests might clash with those of the public, or with those of any other Companies who might make branches connected with it. All contributors to the traffic on the Main Trunk should derive an advantage from it which might be regulated by a scale of comparative distances.

In order to make a portion of the Kilkenny Line, near Dublin, common to a line to Limerick, a survey was made for a Railway to that city, branching from the Kilkenny Line at Sallins, 18 miles from Dublin.

This line, as laid out, pursued a very direct south-western course by the towns of Maryborough and Mountrath, to Roscrea, at which place it passed through a gap in the Slievebloom Mountains, and afterwards continued, by Nenagh, to O'Brien's Bridge, where it crossed the River Shannon into the county of Clare, and thence continuing its direction on the right bank, crossed the Shannon a second time, above Limerick, before it reached that city.

Though favourable as to gradients, this line would be very expensive, on account of the difficulties to be overcome, and particularly by its twice crossing the River Shannon, while the whole of the direct traffic to be derived from it, with the exception of the town of Nenagh, is common to the line from Limerick, by Holycross to Dublin.

The length of the proposed Railway from Limerick, by Roscrea, and Maryborough to Sallins, where it joins the Kilkenny Line, is stated to be 94 miles; comparing this distance with the length of the line from Limerick by Holycross to Maryborough, we find that the former is about 13 miles shorter, but in the one case an expensive line, 94 miles in length, must be made, while in the other a cheap branch of 35¾ miles from Limerick to Holycross will effect the same object. It is further to be observed, that a considerable portion of this branch is common to the Limerick and Dublin, and the Limerick, Clonmel, and Waterford Lines.

For these reasons we are of opinion, that the proposed branch Railroad from the Kilkenny Line at Sallins, by Roscrea and Nenagh, should not be adopted.

As Ireland does not afford sufficient internal traffic to support the distinct lines between the several important places, a combined system is necessary, in order to obtain the greatest amount of accommodation at the least expense of construction and maintenance.

Such a system necessarily implies an increased distance to be travelled as compared with the shortest line, and this principle should be limited only by such an increase of distance as might be deemed more than equal to the advantage to be gained in point of economy; and we consider that limit very far from being exceeded by the combined system we propose, as will be at once apparent, by a reference to the following table, which exhibits its advantages as compared with those of the Kilkenny system.

	Distances common to more than one Place.		Miles of Railway required to be made.	
CENTRAL SYSTEM.	Miles.	Fur.	Miles.	Fur.
Dublin, by Maryborough, to Cork - -	166	5	166	5
Dublin to Limerick - - - - -	125	4	35	6
— Waterford - - - - -	141	2	37	0
— Kilkenny - - - - -	79	0	26	4
Limerick to Waterford - - - - -	73	0	13	0
Totals - - -	585	3	278	7
KILKENNY SYSTEM.				
Dublin to Kilkenny - - - - -	73	4	73	4
Dublin, by Kilkenny, to Cork, - -	170	5	97	1
— Sallins and Roscrea, to Limerick	112	0	94	0*
Dublin to Waterford - - - - -	139	0	32	0
Limerick to Waterford - - - - -	73	0	41	0
Totals - - -	568	7	337	5

Thus it appears, that by the adoption of the system we propose, 585 miles 1 furlong of Railway communication between important places can be effected by the formation of 278 miles 7 furlongs of Railway; while the Kilkenny system would require, in order to complete the same communications, 337 miles 5 furlongs of Railway, which shows a saving, by the central system, of 58 miles 6 furlongs. It is true that in the whole of these lines of about 570 miles, our traffic would have a distance of 16½ miles to travel more than by the other, but we deem such an inconvenience, viewing the speed of Railway intercourse, quite trifling, compared with a saving in the construction and maintenance of upwards of 58 miles of Railway, independently of the advantages already alluded to. With respect to the communication between the different cities and towns, exclusive of Dublin, as, for example, that between Limerick and Waterford, Limerick and Cork, and Cork and Waterford, the respective distances would be the same whether the central or Kilkenny system were adopted, but, by adopting the former, the distance from Kilkenny to any of those places would be materially increased. This, however, we consider to be a matter of minor importance, as it is not necessary, for the general benefit, that Kilkenny should be a thoroughfare

Atlas, Map No. 1.

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* If the branch from the Kilkenny Line to Limerick were to start from Ballysax, beyond the Curragh of Kildare, at the distance of 29 miles from Dublin, its length would be diminished by about 10 miles, but the distance between Dublin and Limerick would be increased by one mile.

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Another branch connected with the Kilkenny Railroad, 44 miles in length, was surveyed from Carlow to Wexford, but on examining the returns from the towns of Wexford, Enniscorthy, and Newtownbarry, through which it was to pass, it does not appear that at present there is sufficient traffic either in passengers or goods from these towns towards Dublin, to warrant the expenditure of so large a sum as would be required for its construction.

Should the country at a future period show resources sufficient to justify the establishment of a Railway between Wexford and Dublin, it is possible that the best line will not be found to pass through Carlow, but along the coast to Arklow, and thence through the county of Wicklow to Dublin.

Already a project is in contemplation for an extension of the Dublin and Kingstown Railway to Bray, and a detailed survey has been made, with estimates which appear to justify its being undertaken as an isolated measure; of course any prospect of still further extension would render it more valuable.

We have reason to know that between Bray and Wicklow there are no material difficulties. Beyond this point the country has not yet been sufficiently explored, and although immediately to the south of Wicklow it presents an unfavorable aspect, as compared with others, a line in this direction to Wexford may hereafter be found worthy of consideration. At present we cannot recommend such a measure, and we have merely alluded to it to remove the impression that the valleys of the Barrow and Slaney present the only line available for Railway communication between Wexford, and Enniscorthy, with Dublin.

We have yet to notice the proposed Railway from Limerick to Waterford, which was one of the earliest, if not the first, that was contemplated in Ireland, after the commencement of that from Liverpool to Manchester, and which was favorably reported on by all the Engineers consulted, and has been a favorite object of speculation for the south of Ireland.

Atlas, Maps 3, 4. By reference to our Passenger and Traffic Maps it will be seen, that between Limerick and Clonmel, the present intercourse is comparatively trifling; but the known resources of the country are so considerable, that rational expectations might be entertained of a favorable result from a Railway, which would open a direct communication from the counties of Clare, Kerry, Limerick, and Tipperary, to the markets of Bristol, the south of England generally, and to London.

Still we cannot admit, that if abandoned to its own local resources, this Railway, would yield profits sufficient to remunerate a Company for its construction. But blended, as we propose that it should be, with the general lines of intercommunication between Dublin, Cork, Limerick, and Waterford, we conceive that the expense of the connecting branch, 13 miles in length, between Donaghill and Marhill, already alluded to, will be considered as a minor consideration, when compared with the advantage which the country must derive from the completion of a direct Railway communication, between Limerick and Waterford.

We next proceed to the consideration of the lines of Railway towards the north, which have been laid out under our direction, as well as of those which have been surveyed at the expense of Joint Stock Companies, or private parties.

In looking from Dublin towards the north, the leading object for consideration is the connexion of Belfast and Londonderry with that city.

Atlas, Map No. 5. In these directions both the physical and geological structure of the country present many difficulties which do not occur in the southern lines. By reference to the Geological Map, it will be seen, that the limestone district always so favorable for the construction of roads or Railways, is bounded on the north by the Rivers Blackwater and Boyne, extending from Kells by Navan to Drogheda, and that the greater portion of the country to the north of that line, whether coastwise or inland, in the direction of Belfast, is composed of transition slate rocks, or of crystalline granite or greenstone, and the whole country is either hilly or mountainous. The direction of the ridges, as indicated by the courses of the rivers, being usually south-east, directly crosses the desired lines of communication, and the general character of the country, with the exception of the Mourne, Slievegullion, and Carlingford Mountains, situated in the counties of Down, Armagh, and Louth, presents an uninterrupted succession of round or elongated hills, having steep acclivities, the narrow valleys interposed between them being occupied either by small lakes, bogs, or by moory or wet land.

Previously to the appointment of this Commission, Acts of Parliament had been obtained for constructing a line of Railway coastwise from Dublin to Drogheda, and also inland from Belfast, by Lisburn and Lurgan, to Armagh; surveys had also been made from Drogheda, in continuation of the coast line by Dundalk to Newry, and thence parallel to the Newry Canal to Portadown, where it joined the Belfast and Armagh Line.

Surveys, independent of the foregoing, were also made, to connect Dublin with Armagh, by an inland line crossing the Boyne nearly midway between Drogheda and Navan, and continuing thence by Ardee and Castleblaney to Armagh.

Several other surveys, though of a less important character, had likewise been made, to connect inland towns with the coast, the greater number of which were intended for tram roads to be worked by horses.

One of these latter surveys extended from Drogheda to Longford, passing through the towns of Navan and Kells; a second from Dundalk to Cavan, passing through Castleblaney and Cootehill; and a third from Portrush, on the north coast of the county of Antrim, to Armagh, passing through the towns of Coleraine and Kilrea, and skirting the western shore of Lough Neagh.

Having the whole of these surveys before us, and weighing the physical difficulties to be overcome in traversing the slate district, north of the rivers Blackwater and Boyne, whether on the coast or inland, as represented in the several sections which have been submitted to us, we directed Mr. Macneill, Civil Engineer, to examine the country between Dublin and Armagh, passing through the towns of Navan, Carrickmacross, and Castleblaney, and also from Dublin to Enniskillen, passing through the towns of Navan, Kells, Virginia, and Cavan, with a view to ascertain whether the country admitted of the construction of lines of Railway in those directions, without requiring any very heavy embankments, deep cuttings, or considerable bridge works.

Mr. Macneill's preliminary Report having been favorable, we directed him to commence the necessary surveys, which he effected in a very satisfactory manner, and with unusual expedition, owing to the facilities afforded by the Ordnance Plans on the six inch scale, which had at that period been published, embracing the whole of the counties through which the surveys were made, with the exception of parts of Dublin and Meath, of which traces from the manuscript plans were immediately supplied by Colonel Colby.

When completed, we found that the surveys and sections were so favorable, as compared with those which had previously been made, that on mature consideration, it appeared to us advisable to adopt them as the main lines for internal communication to the north and north-west of Ireland. It is to be observed, that Mr. Macneill's Survey in the direction of Belfast, extends no further than Armagh, between which point and Belfast a Railroad is now in progress, and for which, as already mentioned, an Act of Parliament had been obtained previously to the appointment of our Commission. Though the line is not as perfect as it might have been made, we determined to adopt it as the continuation of our line from Armagh to Belfast.

In the first series of sections presented to us by Mr. Macneill, he has followed, as Mr. Vignoles also had done, the principle usually adopted in England, of endeavouring by means of excavation and embankment, to approach as nearly as practicable to a horizontal line, to have the summits as few and as low as possible, to rise progressively from the lowest to the highest point, and unless under peculiar circumstances, to admit of no gradient beyond a certain limit, and in this case, none which exceeded 1 foot in 308.

This limitation of gradients, or inclined planes, considered with reference to the anticipated revenue, was found inadmissible; the line was, therefore, regraded, and the limit fixed at 1 foot in 180; in consequence of which alteration, a considerable reduction has been made in the Estimates, amounting in the line from Armagh to Dublin, to the sum of £240,000.[*]

By reference to the Map, it will be seen that the first twenty-eight miles, Plans, Index Map, Part II.

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[*] For detail, see Mr. Macneill's Report and Estimate, Appendix A, No. 4.

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PART I. namely, from Dublin to Navan, are common to both the Armagh and Enniskillen Lines; at Navan they diverge—that to Belfast taking a north course, passing near to Carrickmacross, and through Castleblaney to Armagh; the distance between Navan and Armagh being 57½ miles, and the total distance from Dublin to Armagh, 85½ miles.

Between Dublin and Navan, where the line crosses the limestone country, the gradients are better, and the average cost per mile will be £4,200 less than where it passes through the slate country already described, which extends nearly for the whole distance from Navan to Armagh.*

The north-west, or Enniskillen Line, on diverging from the Armagh Line at Navan, has been laid out in the valley of the river Blackwater, passing through Kells and Virginia. As far as Kells the country is unusually favorable, but between that point and Cavan, and from thence to Newtown-Butler, in the county Fermanagh, the cost of forming will be considerable, owing to the hilly character of the slate district. Beyond Newtown-Butler the line passes through the flat country skirting the north-eastern margin of Upper Lough Erne. In such a locality, the gradients, as might be expected, are excellent, and the cost is proportionally reduced.

The town of Enniskillen, situated between Upper and Lower Lough Erne, may be considered as a central station, towards which both passengers and commercial traffic may be expected to converge for a considerable circuit, including the important towns of Londonderry, Letterkenny, Strabane, Omagh, Donegal, Ballyshannon, and Sligo, and hence, for the present, it is considered to be the most suitable point for the termination of the north-western Railway. At a future period, it is probable that a Railway may be constructed from Londonderry to Enniskillen, passing through the towns of Strabane, Newtown-Stewart, and Omagh; and a preliminary Survey for a line through those places has been submitted to us by a very respectable body of gentlemen interested in the improvements of the adjoining districts of the counties of Donegal, Derry, and Tyrone; but we are satisfied, that for some time to come the expected intercourse through the country would not be sufficient to warrant the commencement of this Railway.

In forming a comparison of the advantage which the lines to the north and north-west of Ireland, recommended by us, possess over the others to which we have alluded, there is only one which traverses the interior of the country to which we think it necessary to refer, namely, that from Dublin to Armagh, passing through Ardee and Castleblaney, already mentioned.

For general purposes this line would not be favorable to the views adopted by us; it is not sufficiently near the coast to be used for connecting the important commercial towns of Newry and Dundalk with Dublin; and on the other hand it does not strike far enough into the interior to render any portion of it suitable for a main line to the north-west.

In an engineering point of view it is likewise inferior, inasmuch as it is proposed to cross the river Boyne by an embankment about 460 yards in length, the greater portion of which, as shown by the section, would exceed 100 feet in height; while the line which we propose crosses the river above Navan, by an embankment of 260 yards in length, and at an average height of but 33 feet; and likewise between Castleblaney and Armagh, the line is not so advantageous either in length or gradients as that laid out under our direction.

Atlas, Map No. 1. In respect to the Coast Line, which has been surveyed from Drogheda by Dundalk to Newry, we have to observe, that it may be considered altogether in the light of a speculation which has no reference to the internal commercial traffic of the country, but as one which will afford a desirable facility for passenger intercourse between the important commercial towns which it is intended to connect; but unfortunately the range of the Carlingford Mountains, which is interposed between Dundalk and Newry, presents an insurmountable obstacle to the construction of a direct line of Railway between those points; and, in consequence, a survey has been made, skirting the base of the mountains along the northern verge of the Bay of Dundalk, which, passing round by Carlingford, continues along the southern margin of Carlingford Lough to Newry, and thence nearly in a straight line to Portadown.

We have not thought it necessary to make any particular investigations in respect to the probability of the success of this line; but if the data which

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* In the neighbourhood of Carrickmacross the line passes for a few miles through an insulated tract of limestone.

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have been put forward by its projectors be correct, we are rather disposed to think that as soon as the coast Railroad from Dublin to Drogheda shall have been completed, the prolongation to Dundalk, and thence eventually to Newry might be desirable, but we do not offer any opinion as to the probability of its becoming a remunerative speculation. It is to be observed, that the towns of Dundalk and Newry already possess considerable trade with England and Scotland, and particularly with Liverpool and Glasgow, to which ports the merchants transmit the produce of the districts situated immediately to the westward, and receive in return merchandise to supply the wants of the people. This direct marine traffic will not be affected by the construction either of the Coast Railway or that of the interior recommended by us. The agricultural produce will still pursue its natural course to the nearest port on the coast, from whence it is now transmitted with cheapness and rapidity to the best markets of Great Britain, by means of large and powerful steam vessels.

Atlas, Map No. 1.

In respect to Railway communications from Dublin, westward, towards Sligo and Galway, we have not thought it necessary, under existing circumstances, to make any special investigation; but surveys and sections have been submitted to us of a proposed line of Railway from Dublin, in a western direction, to Mullingar, and thence, in a north-western direction, by Longford and Carrick-on-Shannon to Sligo. A line has also been laid out in a western direction, from Mullingar, by Athlone, Ballinasloe, and Loughrea, to Galway.

These Lines which, for their entire length, pass through the limestone country, present no very important obstacles, at least none which could not be avoided in the execution; so that we have no doubt that the Railways might be completed at an average cost of about £8,000 per mile for a single line of rails.*

Atlas, Map No. 1.

On looking to the Map of Ireland, we find that the lines of the Grand and Royal Canals, two of the most perfect still-water navigations in the British empire, and on which there is at present a very considerable traffic, both in merchandise and passengers, extend from Dublin to the westward; the Royal Canal, by Mullingar and Ballymahon, to Tarmonbarry, on the river Shannon, with a branch to Longford; and the Grand Canal, by Philipstown and Tullamore, to the Shannon, near Banagher, with a branch to Kilbeggan, and a prolongation on the western side of the Shannon, from Banagher to Ballinasloe, in the county of Galway.

The line of the proposed Railroad from Dublin to Sligo, runs parallel to the Royal Canal, and passes through the same towns, namely, Mullingar and Longford, and that from Mullingar to Galway passes near to Kilbeggan through Athlone and Ballinasloe, all of which are connected with the Grand Canal. Under these circumstances, it is evident that the proposed Railroads could not succeed unless by withdrawing the whole, or a considerable portion of the traffic of these valuable canals; and when it is considered, that a boat, drawn by one horse, usually contains 50 tons of flour, grain, or other agricultural produce, it is more than probable that the rapidity of transport afforded by a Railway would not be sufficient to induce the transfer of the commerce of the Canal to the Railway, and particularly, as in the event of such opposition the Canal Company would, no doubt, reduce their tolls to the lowest scale. But supposing it should have the effect of transferring the trade, we could not recommend that these canals, on which so large a sum of money has been expended, should be sacrificed or injured for the purpose of promoting a doubtful speculation.

We are aware that in England this consideration has not been deemed sufficient to prevent the adoption of Railways between large commercial towns which commence and terminate at the same points with existing navigations, as in the case of the Railway from Liverpool to Manchester. But such policy is not suitable to Ireland, where internal traffic is comparatively trifling, and where commercial enterprise has hitherto made so little progress; and consequently, in those localities where Navigations have been completed on a large scale, and in a superior manner, at the cost of more than three millions, it appears to us to be injurious to the best interests of the country to promote other speculations having a tendency to injure or destroy them. Hence, in suggesting lines for Railway communication, we have endeavoured, as far as local circumstances would permit, to adopt those which would open districts beyond the influence of existing Navigations.

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* The entire distance from Dublin, by Mullingar, to Galway is 133 miles, and from Mullingar to Sligo is 80 miles, making a total of 213, which at an average cost of £8,000 per mile, would give a gross amount of £1,704,000 as the entire cost, or if a double line of rails were used, of £2,130,000.

In respect to passengers it is to be observed, that the fly-boat system has been introduced on the Grand and Royal Canals, and that at this moment passage boats travelling at the rate of seven miles an hour, pass and repass daily between Dublin and Mullingar on the Royal, and between Dublin and Shannon Harbour and Athy on the Grand Canal, and all the other important stations on both canals. But in respect to this species of traffic, we must observe, that as far as passengers are concerned, we conceive that the canals would not be materially, if at all injured, were the system of passage boats altogether abandoned.

We have ascertained from returns procured from the Royal Canal, that although the income derived from passengers is considerable, the direct expenditure connected with them is so great, as to absorb above seven-eighths of the receipts; and if to the direct expenditure be added the cost of repairing the injury which the canal banks sustain from the wave, created by the rapidity of the fly passage boats, and the increased number of lock-keepers and assistants who are employed to attend them at night, as well as by day, we are of opinion, that on the whole, the Company derives no profit from the passengers; and in dry seasons the commercial trade is inconvenienced and injured by the quantity of water drawn from the summit level by the ascent and descent of the passage boats through the locks.

From the foregoing, it would appear, that were a Railway made from Dublin to Mullingar, branching from the Main Southern Line, near Celbridge, it must depend almost entirely on passenger traffic for its support. This branch would be about 38¾ miles in length, and would cost about £310,000. In order to determine whether or not there is any probability of a successful result from this branch, arising from passenger traffic alone, we have ascertained as far as was practicable, the number of passengers which at present leave Dublin weekly, and travel by the road or by the canal, towards Galway and Sligo, by Kinnegad and Mullingar, and the result has not been favorable to the undertaking.

By means of the Royal Canal passage boats, the public is at present supplied with a convenient and very cheap mode of conveyance between Dublin and Mullingar, and though the journey is performed somewhat more rapidly by the coaches than by the fast or fly boats, still the number of passengers is greater by the canal than by the road; it further appears, that by the canal the number of passengers travelling by the slow night boat which goes at the rate of 4 miles an hour, is greater than by the comparatively swift day boat which travels at the rate of 7 miles per hour, in the proportion of 13 to 7. On investigating the cause of this difference, we find that the fare by the night boats amounts on an average of the first and second cabin to 1*d.* per mile, while by the fly (day) boats it is 1½*d.* per mile, and by the coach 3*d.* per mile; hence, it appears, that cheapness and not rapidity is the chief object with the majority of passengers between Dublin and Mullingar; and as the present fare per mile by the night boats, on an average of the first and second cabin, is 1*d.* per mile, and the proposed average by the Railway is 1½*d.* per mile, we have reason to conclude that the formation of a Railway in this direction, will not materially increase the number of travellers of the class which now travel by the slow passage boats.

In respect to the passengers by the road, it is to be observed, that the greater number travel from Galway and Sligo; and as the coaches require about 15 hours to perform the journey from Dublin to those places, it is not probable that travelling by a Railway for a small portion of the distance, and which would only reduce the time from 15 to 12 hours, assuming that the Railway and coaches were to act in perfect concert, would cause any considerable increase in the number of passengers on those lines.

But to place the matter in the clearest point of view, we may refer to the Passenger Traffic Table for this line, given in page 28, which has been calculated on the same principle, and from data procured under the same arrangements as those for the great Southern and Northern Lines; and having made all the allowances for an expected increase of passengers which the peculiar circumstances of the district would admit of, we find that 272 is the gross equivalent number which can be expected to travel on every mile of Railway between Celbridge and Mullingar, supposing that the canal passage boats were abandoned, which is very doubtful, at least in respect to the night boats. The case will then stand thus:—

No. of Passengers.		Miles.		Days.		Equivalent No. per annum.				Gross Income per annum.
272	×	38¾	×	365	=	3,845,640,	at	1¼*d.*,	=	£20,019 7*s.* 6*d.*

To enable us to determine whether or not the above income will suffice for working the road and leave a surplus towards paying the interest of the capital to be expended, we must refer to page 60, Part II. of our Report, in which the estimated annual cost of each Locomotive Engine, together with the proportionate allowance per mile, to cover the wear and tear of the Railway attendants, &c., is fully detailed.

To afford the public the same accommodation which it possesses at present, two locomotive engines, at least, will be required, which, including the wear and tear, &c., will cause an annual expenditure amounting to £15,421 17*s.* 6*d.* If we deduct this sum from £20,019 7*s.* 6*d.*, the expected amount of income, we have a surplus balance of £4,597 10*s.* towards repaying the interest on an expenditure of £310,000—a result which must be considered fatal to the speculation.

On examining a prospectus which has been published for a proposed Great Central Irish Railway, to extend from Dublin, by Mullingar, to Athlone, with branches to Longford and Kells, a total of 132 statute miles, the estimated cost amounts to £8,500 per mile, and £1,175,000 for the whole.

The amount of revenue expected to arise from the transport of passengers and merchandise on this line, is calculated at £297,950 per annum, equal on an average to £2,151 per mile.

If we select the portion which extends between Dublin and Mullingar, it will, doubtless, be considered as that from which the best return may be expected; and, consequently, in considering this line, according to the data afforded by the prospectus, we cannot err in calculating on the average of £2,151 per mile, and which, for 38¾ miles, the length of the proposed branch from the Southern Main Trunk Line to Mullingar, would form a gross income of £83,351 per annum, which is rather more than four times the amount of our calculated income, on the same line, arising from the conveyance of passengers and small parcels alone; and as we have shown that the Royal Canal could, at all times, convey agricultural produce and heavy merchandize cheaper than any Railway, we are decidedly of opinion, that the amount of expected income set forth in the prospectus, is quite fallacious.

In concluding the consideration of the subject of proposed Railways in Ireland, we think it right to advert to the only Railway that has as yet been executed, namely, that between Dublin and Kingstown, an undertaking which from its peculiar position and resources, has been attended with considerable success. But this success must not be assumed as a criterion on which to form a judgment as to the probable advantage to be derived from other Railway speculations in this country.

As a work of art and arrangement, many useful lessons have been acquired in the construction and the working of the Dublin and Kingstown Railway. The directing and managing Officers have shown a liberal and inquiring spirit; whatever errors may have been committed are attributable solely to the universal want of experience in these novel establishments; and the Company is still only feeling its way towards correct principles, which may yet require many trials and efforts to establish. At the same time the most creditable regularity and system prevails throughout the establishment, and several improvements have been made, the credit of which is wholly due to the ingenuity of the executive officers, and which, we are happy to think, exhibit Irish talent and exertion in a very favorable light.

PART II.

Part II.

Inquiry into the Probable Return on the Capital which would be required to Construct and Work the Proposed Lines.

1. EXAMINATION OF THE MECHANICAL PRINCIPLES OF RAILWAYS.

It is only a few years since Railways, intended for general traffic, have been introduced, and from that time to the present, continual changes have been made in the modes and form of construction, and these changes and ameliorations are still in progress.

Form of Rail.—The rail itself has passed through an innumerable variety of shapes, both transversely and longitudinally; the form of the chair in which it rests has been equally varied; the modes of fixing the rail to the chair, and the chair to its support, have also been subject to continual change; again the supports for the chairs are in some cases stone-blocks, in some wood; this wood is sometimes laid transversely, and sometimes longitudinally. The joints of the rails have been made, in some cases, what is called half-lapped, in others scarfed, and again plain butting joints; and so on in various particulars connected with the principles of construction. It may be observed that these different principles have not merely been adopted in different Railways, or in different parts of the same line, but the same parts of the same line have been relaid and replaced by new rails; the distance of the blocks have been varied from three to four feet, or five feet, and rails of greater strength substituted accordingly. These uncertainties have led to enormous expenses, and have greatly depreciated the value of some lines of very extensive traffic, while they have entirely absorbed the income of others. It would, therefore, have been very gratifying to us, if, by an impartial examination of the different modes that have been adopted, or by the information we have had the means of obtaining from the Directors of Railways and their engineers, we could have been able to recommend some particular principle of forming the road that would insure permanency and durability, and thereby save to new Companies the ruinous expense to which we have alluded.

But although an obvious improvement is going forward in this particular branch of Railway practice, we feel that so much is still requisite to be accomplished, that no one principle at present employed can be confidently recommended by us for general and final adoption.

Mode of Laying.—The question whether stone-blocks or wooden longitudinal sleepers present the greater advantage, is one on which opinion is greatly divided, and which, we conceive, ought to be left open to the proprietors of such works. Large stone-blocks and heavy rails, supported at greater intervals than was originally adopted, are now, we believe, almost universally admitted to be more economical than lighter rails with shorter bearings. But the question whether these are preferable to wooden longitudinal sleepers, is at present unanswered, and perhaps unanswerable, till the latter have been submitted to the test of some years' experience. In Ireland, stone is plentiful and cheap, and would probably be preferred, and thereby produce a great demand for native labour.

On the Breadth of Way.—It will not be necessary for us to advance many arguments to prove the advantages of one uniform bearing distance or breadth of way on the different lines of Railway, which are intended to form a general system; for, if this be not enforced, great and serious impediments must arise when these lines join or intersect each other, while the great advantage of different Railway carriages and their several parts being applicable to any new line would be thereby sacrificed. Facility of transport is the great principle of Railway practice, and if passengers or goods, after travelling 50 or 60 miles, arrive at a line of communication having a different breadth of way, a general unloading and reloading must be had recourse to, occasioning inconvenience to passengers, probable damage to merchandise, and certain delay to both.

In the novelty of this mode of intercourse in England, this important point has been overlooked in the several Railway Bills which have passed the Legislature, and much inconvenience is in consequence anticipated to arise both by English engineers and Railway proprietors.

It is therefore very desirable, in a country like Ireland, at present almost untouched by these works, that some uniform standard distance for the rails should be adopted; what that distance should be is a question of considerable importance, and has accordingly engaged our most diligent attention. We have endeavoured by obtaining the opinion of different eminent engineers, and weighing the several arguments they have advanced, to draw from them the conclusion most satisfactory to our own minds, as to the breadth we would recommend to be adopted in that country to which our inquiries are more particularly directed.

On ordinary roads, the distance between the wheels is about four feet six inches, or five feet; giving a breadth of bearing, which it is to be presumed has been found convenient; and it is most probable that in the construction of the first locomotive Railway, the usual distance of the carriage wheels and lines were adopted, without any consideration whether that breadth was equally advantageous in the novel practice of locomotion. Recently, however, the propriety of adopting this breadth has been questioned, and a marked innovation recommended, of extending the breadth to seven feet.

This must necessarily increase the first cost of engines and carriages, and also of cuttings and embankments; but as the present distance between the double lines of way is limited, not by the bearing distance of the wheels, but by the breadth of the carriages and loads, we do not conceive that it would be necessary, although the bearing distance should be increased, to enlarge, to any serious amount, the dimensions of bridges, tunnels, or other expensive parts of the works. Let us see, then, what advantage may be expected to flow from this innovation.

In the first place, it is clearly advantageous to reduce the friction on the axle, and the resistance on the rails, as much as possible, which, all other things being the same, will be inversely proportional to the diameter of the wheels. It is also advantageous to keep the centre of gravity of the load as low as possible, for, from the nature of the conical figure given to the bearing part of the wheel, the carriages are in a constant state of lateral oscillation, and the less the height of the centre of gravity, the less of this effect will be produced, the less also will be the wear and tear of the carriages, and the more easy and pleasant the motion to the passengers.

From the nature of the locomotive engine, its power is so great in proportion to the friction it has to overcome, that it is capable of drawing a load which (even with a greatly increased breadth, as compared with common road carriages,) extends to a very considerable length, and in order to reduce this length as much as possible, it is necessary with the present breadth of way, to make the wheels run within the frame which supports the carriage; the seats of the passengers are therefore placed above the periphery of the wheel; the load is thus disadvantageously raised, and in order not to increase the evil more than is actually necessary, the wheels are made proportionally small, which causes a greater amount of friction than would be otherwise incurred, and gives a less power of overcoming the resistance of the rail.

Now, these inconveniences may certainly be avoided, preserving the same carriage-room, (which, from its adoption on most lines, it is to be presumed is found to be convenient,) by extending the breadth of bearing of the rails, so as to allow the wheels to run outside the frame, instead of running within it.

This, with a slightly modified form of carriage, will admit the diameter of the wheels to be increased, thereby reducing the friction, and increasing the power to overcome the surface resistance, at the same time that the load itself may be reduced in height, being, in this case, limited by the axle of the larger wheel, instead of the upper part of the periphery of the less wheel; and with this reduction of height, the wear and tear will be reduced, and the smoothness and ease of the motion increased. Moreover, the force to be overcome being less, with the same load, we may, by retaining the power of the engine the same, carry a greater load than at present, with the same velocity; or, by retaining the present load, carry it at a greater velocity, by increasing the diameter of the driving wheels of the engine; or, if it be not desirable to increase the velocity, the speed of the piston might be reduced, which would be a great practical advantage; or, lastly, preserving the same load and velocity, the power and weight of the engine may be made less; and, probably the one or the other of these arrangements would be adopted, according to the nature of the traffic on the road.

Thus, in passenger and mail trains, it might be found desirable to increase the velocity, whereas in the carriage of heavy goods, mineral productions, &c., it would be most economical to increase the load.

There is, however, one important point connected with this innovation which must not be overlooked, viz., that the whole of the advantages pointed out above apply only to horizontal lines. Now, generally, lines of Railway have various gradients or inclined planes, in ascending which, the load has to be raised in opposition to gravity, and the power necessary to effect this is frequently equal to, or exceeds that which is employed to overcome the friction, and will remain the same to whatever extent the friction is reduced.

In order, therefore, to avail ourselves fully of the reduced friction, those planes which are not worked by assisting power require to be reduced in their slopes in the same proportion as the wheels are increased, or otherwise, that assisting power be applied on proportionally less slopes than according to the present practice. In other words, the power of the engine is employed in overcoming the friction of the load and in raising it up the several gradients, and what is gained by opening the rails and making the wheels run outside the frame, applies only to the former, the latter remaining the same as before; and the advantage of the alteration would be over-rated if this circumstance were not taken into consideration.

But, even with this deduction, the advantage is considerable, particularly as regards the convenience it would afford the engineer in disposing of the several parts of the engine gear of the locomotive, and there can be no doubt, in a new country, as regards Railways, that provision should be made for taking advantage of this improved practice, and for securing uniformity of breadth. The only question is, therefore, what that breadth should be? The frames of the present carriages are about 6 feet in width; without, therefore, interfering with the convenience of present coaches, or, by only contracting their breadth a very little, the wheels might be made to run outside the frame by increasing the present distance of the lines to 6 feet 2 inches. This would allow of wheels of 4 or 5 feet in diameter, which would reduce the amount of friction in the proportion of 10 to 7: a greater distance, as 7 feet, would allow, perhaps, wheels of 6½ or 7 feet in diameter, which would reduce the friction by nearly one-half; but it is questionable whether the distance should be so far extended and enforced as a part of a general system, particularly when it is considered that the more the friction is reduced, the greater will be the proportional impediment presented by the gradients on the line. At present, on most lines in action, especially in the passenger trains, the load is seldom equal to the power of the engine, and this being the case, but little would be gained by reducing the resistance already inferior to the power by which it is to be overcome, except by allowing an increased speed on the line generally, and on the level planes in particular.

With a full and overflowing traffic, there could be no doubt as to the advantage of employing the greatest breadth or distance of bearing which other practical considerations would render advisable; but it seems useless, or worse than useless, to incur a present expense, to provide a benefit of which it is scarcely probable that there will ever be the means of taking advantage. If it were possible to reduce the weight and power of the locomotive proportionally to the reduced friction, it might still be advisable to extend the breadth to 7 feet, and the diameter of the wheels to 6½ or 7 feet, but this is impracticable, in consequence of the force necessary to raise the load up the gradients, which part of the force, as already stated, is not diminished by the alterations; moreover, the smaller engines are not worked so economically as the larger.

Considering, therefore, all these points, we think it advisable to recommend a uniform distance of Railway lines for Ireland, of 6 feet 2 inches, which will have the effect of greatly reducing the friction, while by lowering the centre of gravity of the load the present vibratory motion of the carriage will be greatly diminished, and, consequently also the wear and tear of both the carriages and of the line of way; advantages which, it is presumed, will be cheaply purchased by a small addition to the first outlay.

The Effect of Curves.—The most advantageous direction for a Railway, particularly one on which great velocities are adopted, is clearly a right line; but the nature of the country will seldom admit of this degree of perfection in the construction, and it becomes, therefore, a question of considerable interest to ascertain the effect of curves on a line, both as regards the wear and tear of the engines and the safety of the passengers.

Theoretically, there would be no disadvantage in curvatures, with wheels properly coned, provided the carriages ran on two wheels only—that the rails participated in the general curvature—that the curves were always passed with the same velocity, and the outer line of rails properly raised to equalise the pressure of the carriage upon it. These are matters of easy calculation. In this case, the axle of a single pair of wheels would always be directed towards the centre of the circle, of which the curve is a part, and the outer line being adequately raised, the inclination of the engine and carriages would be adjusted to the centrifugal force due to the velocity; the same would take place in carriages with 4 or 6 wheels, if the axles could adjust themselves, so that each might point to the centre of the curve. But this is not the case; and there will, therefore, be a straining force, the effect of which must necessarily be to wear, and ultimately to destroy, the parts of the engine exposed to its action; and it is equally clear, that the less the radius of this curve is, the greater will be the effect; but we believe it to be impossible to calculate the amount of it on any certain principle; and we have, therefore, in this, as in other cases, had recourse to practice, and have endeavoured to ascertain, by inquiries made of different engineers, what has been the result observed on the several lines under their direction, in which such curves occur.

From the answers thus received, it does not appear that curves are so injurious to the working of a Railway as we might have anticipated, although it is clearly desirable to employ them as little as possible, and to form them, when necessary, of the largest practicable radius, consistent with proper economy in the first outlay; but we consider that it would be by no means safe for us to define any limits to the practice. One of the strongest cases we have met with, of what may be done practically on curves, is that furnished us by Peter Sinclair, Esq., to whom we have, on other occasions, been much indebted for valuable practical information.*

To our inquiry on this subject, he replies as follows:—

> "One curve upon this line (Bolton and Leigh) of a quarter of a mile radius, is probably every day taken in one direction, with all the speed the engines can get upon their trains (30 miles per hour), especially when heavy, with the object of surmounting the short inclinations noticed in the list of gradients formerly sent, of 1 in 100, and 1 in 200. We have never had an accident resulting from this in a direct manner, though I have no doubt that our wheels and axles, and probably other parts of the engines and carriages have suffered materially from it. Several of our engines, I should notice, have now a third pair of wheels, which, of course, render sharp curves the more objectionable."

We might quote several other authorities, mostly tending to the same conclusion.

Absorbed Power in Locomotive Engines.—One of the first points to be considered in reference to the mechanical advantages of Railway communication in comparison with canals and the usual road traffic, is the amount of power which must necessarily be expended before any force of traction can be communicated to the load. This expenditure, or absorption of power, far exceeds what would, in the first view of the question, appear at all probable. Few persons, perhaps, are aware, that the power absorbed in the largest of the engines at present employed on the Liverpool and Manchester line, in order to put the engine, &c., in a condition to move, and independently of any power applied to the motion of the load itself, amounts to about one-third of the whole power expended; yet such is the case, and it will be seen, therefore, how essential it is to the success of any Railway undertaking, with locomotive power, that a very great amount of goods and passengers should be conveyed, and these not in small detached portions, but in large masses.

In fact a large and abundant traffic is essentially necessary to the success of any Railway, undertaken as a matter of profitable speculation to its subscribers; and although there are certainly cases, where a line is opening the resources of a country, in which a less amount of present revenue may be held sufficient,

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* See Mr. Sinclair's letter on this and other subjects, Appendix A, No 12.

Part II.

yet it is proper that a full and satisfactory illustration should be given of the great proportional increase of charge per ton per mile, which would necessarily be incurred in the case of a deficient or inconsiderable traffic.

As part of the above statement may appear extraordinary, and as we believe that the subject has not been hitherto generally comprehended, it will be proper to point out the sources to which this absorption of power may be traced. These are :—

1st, The friction of the engine gear, independently of any load.

2nd, The friction of the wheels, axles, &c., of the locomotive itself.

3rd, The friction of the wheels, axles, &c., of the tender.

4th, The constant resisting pressure of the atmosphere to the motion of the pistons: all which retardations must necessarily be overcome before any remaining force can be made applicable to the traction of the load.

We have not thought it advisable to introduce the numerical computations on this head into the body of the Report, but by referring to Note D, it will be seen that we may assume in general very nearly one-third of the whole steam power employed, as absorbed in what may be termed "preparing to move a load," and this is the same for great or for small loads; the consequence is, as shown in the Note referred to, that the relative expenditure of steam power per ton per mile is nearly six times greater for a load of 10 tons, than for one of 100 tons, and so on in different proportions for other defective loads. The same relative increased expenditure is incurred for wages to the engineer, stoker, and other persons engaged in conducting the loads. The expense of wear and tear of the engine bears at least the same ratio, not to mention all the fixed expenses of direction, stations, gatekeepers, road-attendants, &c., which will obviously be increased in a still higher proportion.

The question here, however, is merely the relative cost of working with different loads, which is reduced to a tabulated form, in the Note above quoted.

By comparing the resulting expenses as exhibited in these Tables, which are wholly independent of original cost of construction, we have a convincing proof of the necessity of a large and uniform traffic in every undertaking of this kind, and the ruinous consequences which must follow from allowing rival lines, or such as shall divide between them the traffic, the whole of which is so essential, if even adequate, to the maintenance of either. It will indeed be obvious, when we speak of the actual expenses of maintenance and haulage, that these are very great; and, therefore, in circumstances where one Railway might be a great national benefit, by the facilities it would afford to trade in the transfer of goods and general merchandise, and an important public convenience by the easy and expeditious mode of travelling it would insure, two such lines would almost as certainly lead to the unprofitable absorption of capital, and, for want of due remuneration, to an indifference and neglect of the important active duties which such establishments demand, so as ultimately to become, instead of a public benefit, an actual and unalterable nuisance.

The effect of Gradients.—The term gradient has been adopted to indicate those slight inclinations up which a load may be taken, although with a diminished velocity, without assisting power; being thus distinguished from those steeper slopes, termed inclined planes, where assisting power, either stationary or motive, is intended to be used, according to the general practice of the road; but these latter may still be ascended with small loads by the power of the single engine only, so that, in fact, there is no distinct limit between those slopes and the former; it will, however, be generally understood that a gradient is a slope of small inclination.

If the power exerted by a locomotive engine were wholly applicable to the traction of the load, that traction being a determinate fraction of the weight moved, then in ascending a gradient whose inclination is expressed by a fraction represented by the height of the plane divided by its length, the engine power required for the ascending plane would be to that on the horizontal plane, as the sum of the two fractions (viz., that which expresses the angle of the plane, and that which represents the friction,) to that which expresses friction only.

Thus, if, as is commonly the case, the friction and surface resistance is 8 lbs. to the ton, or $\frac{1}{280}$th part of the load, then, in ascending a gradient of $\frac{1}{280}$, the required force would be double that for the horizontal plane, and so on for any other proportions. But this is true only of the force of actual traction, and not of the power expended by the engine.

To know the relative engine power requisite in these two cases, we must take into consideration the part of that power which is necessary in order to put the engine itself into a condition to move, that is, the power requisite to overcome the friction of the engine gear, without a load; the surface resistance, and the friction of its own axles and wheels, as well as those of its tender; and lastly, the resistance or pressure of the atmosphere against which the pistons are constantly acting.

These forces together, which must be all overcome by an expenditure of steam power, and a consequent consumption of fuel, before the surplus power can become applicable to traction, amount, as we have seen, to nearly one-third of the whole; and as this amount of absorbed power is the same either on a horizontal or on an inclined plane, the relative force or steam power requisite in the two cases, will be very different from that of the force necessary for traction only, and will vary very essentially according to the amount of the load the engine is employed in drawing, the dimensions of the engine itself, and the inclination of the plane.

In order, therefore, to estimate correctly the effect of gradients on the expense of working a line of Railway, we must first inquire into the amount of steam power absorbed in overcoming the resistance to which we have referred. We have not thought it expedient to enter upon these several reductions in the body of the Report, but by referring to Note E, the several results derived from them will be found arranged in a tabulated form.

In the Note referred to, is shown the amount of duty which a first-rate locomotive engine is capable of performing on a horizontal plane; our immediate object now is to show how much that performance will be reduced on the supposition of certain planes and gradients occurring on the line of way.

We must observe, however, that these reductions will not affect in an equal degree the cases of minimum and maximum traffic; because in the former the duty performed by the engine is not limited by its want of capability, but by a want of due employment; the effects we have traced, therefore, principally apply to cases of abundant traffic. By referring to the Note quoted it will be seen that the effect of a gradient in retarding the load, and therefore leading to an additional expenditure of steam power, varies with the amount of the load, the dimensions of the engine, and the degree of inclination. Taking a medium engine and gross loads of 100 tons and 50 tons, that is, including engine, tender, and waggons, it appears that the expenditure of steam power, including the absorbed power, necessary to overcome a resistance of $\frac{1}{280}$th of the load is expressed by $\frac{1}{139}$th of the same, when the gross load amounts to 100 tons, and by $\frac{1}{97}$th when that load is 50 tons. While, therefore, the power of traction is doubled in ascending a gradient of 1 in 280, the requisite steam power will only be increased about one-third with 100 tons, and by little more than one-fourth with 50 tons.

It is important to attend to these facts where only a moderate traffic can be expected, as it will serve to show the impolicy of expending large sums in the formation of great excavations, embankments, &c., in cases of minimum or moderate traffic, although they might be perfectly justifiable where the traffic is likely to be abundant. For, in the latter instance, not only do the gradients retard the speed, and thereby increase the expenditure of steam power, but they have a still more injurious effect by limiting the amount of load which the engine is capable of conveying; it being obvious that a large load, yet such as the engine would be fully capable of drawing along a horizontal plane or medium gradient, might be altogether beyond its power on a plane of certain inclination. In such cases, therefore, a considerable expenditure might be advantageously incurred in the first outlay in reducing the gradients, which would be altogether useless on a line where only a moderate traffic is to be expected.

It will be seen in this Report, how essential it is to the success of a general Railway system in Ireland, that the cost of construction should be kept as low as possible; and nothing will tend more towards that object, than carefully avoiding those expenses which are sometimes incurred by aiming at a degree of perfection of which we are afterwards unable to avail ourselves, and which can only be repaid on a line of very extensive traffic.

Part II.

2. COST OF CONSTRUCTING AND MAINTAINING.

Cost of Construction.—It is obvious that much of the success which will attend the profitable working of a Railway, depends on the first cost of its construction, of which it is difficult to form a very accurate estimate prior to undertaking the execution. Hitherto the estimates formed of such works, and "proved," as it is termed, before Parliament, are commonly very inadequate data on which to proceed; the actual cost not unfrequently exceeding the sums thus "proved" by many hundred thousands of pounds, and in one case, at least, by more than a million and a half. We allude here to the London and Birmingham Railway, the Directors of which line published, in January, 1837, the following comparison, between their original Parliamentary estimate, and that then formed of the probable expense which would be incurred before the work is completed, independently of extra charges for extension of the original line, viz.:—

ESTIMATE of the Cost of the Railway to the Time of Completion, compared with the Parliamentary Estimate.

		Present Estimated Cost.	Parliamentary Estimate.	Excess.
		£	£	£
Land and Compensation,		506.500	250,000	256,500
Contract Works for forming the Road,		2,146,068	1,703,830	442,238
Rails, Chairs, Blocks, Sleepers, and Incidental Charges,		693,822	366,977	326,845
Stations and Carrying Department:—	£			
Buildings,	154,521			
Locomotive Engines,	100,215			
Carriages, Waggons, &c.	153,500			
		408,236	80,000	328,236
General Charges:—				
Expenses of obtaining Act of Incorporation,	72,869			
Law Proceedings, including expenses of amended Acts,	12,000			
Conveyancing,	53,800			
Engineering and Surveying,	127,100			
Direction,	13,300			
Office Charges, Salaries to Secretaries, &c.	27,515			
Printing and Advertisements,	4,800			
Sundries, including travelling charges and all other expenses,	10,600			
		321,984	99,191	222,791
		*4,076,610	2,500,000	1,576,610
Euston extension, (including Passenger Station)		255,722		
		4,332,332	(SIGNED,)	
Interest on Loans,		144,262	R. CREED, C. R. MOORSOM,	Secretaries of the Board.
Total estimated cost,		£4,476,594		

The great difference between the actual and estimated cost, we believe, has led to the abandonment of very important canal works in England, after they had been partly executed, and such would undoubtedly be the case with Railways in Ireland, if such discrepancies were found to exist as those above alluded to; an evil which it is above all things necessary to guard against.

We have examined the estimates of the several Railways last year brought before Parliament, the number of which is forty-eight; their united length is 1233 miles,[†] and their estimated cost £19,352,726 sterling, averaging £15,695 per mile; but, judging from the experience furnished by those already executed, the expense will scarcely fall short of £20,000 per mile. This may indeed be taken as the medium charge in England, although we have instances (exclusive of those lines in the vicinity of the metropolis, the cost of which is excessive) of differences of expense varying between £40,000 and £10,000 per mile, which latter sum is, perhaps, the least yet incurred in the construction of

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[*] We understand another estimate has since been made, which brings up this sum to four and a half millions.

[†] See Whishawe's Analysis of Railways.

a really well executed Railway for general traffic. We allude here to the Newcastle and Carlisle Railway, which, we are informed, has been executed for that sum; at present, however, only about half the length is laid with a double line of rails. We learn also that the Wigan Line of 7 miles, was executed at a like cost.

The great difference between £40,000 per mile, and £10,000 per mile, (within which limits in the cost of construction, most of the lines at present projected will probably fall,) has naturally led us to inquire into the causes of such disproportion, and we have, in most instances, traced it to some one or more of the following circumstances:—

1st. To excessive Parliamentary expenses, incurred during one, two, or more sessions, in obtaining a Bill; this cause of expense arises out of competition between opposing lines, which is sometimes real, but more frequently fictitious, and is instituted by interested parties, not, perhaps, in their own names, but in those of the landowners, whose interest should rather lead them to promote the undertaking. In many cases, this charge alone, even in very long lines, has exceeded £1000 per mile.

2nd. To the enormous demands for compensation by proprietors, through, or near to whose land the proposed line passes, and who withhold their assent, till purchased by the Company on the most ruinous conditions. We have instances in which this species of extortion amounts to £10,000 per mile.

3rd. Extravagant expenses are frequently incurred by Companies pushing the termini of their lines too far into the centre of towns, and in carrying their lines through towns; in order to effect which it becomes necessary to purchase much valuable property.

4th. We have reason to believe that engineers in general have incurred heavy and sometimes ruinous expenses, in order to render their lines mechanically as perfect as possible, without duly considering whether the advantages thus obtained will compensate for the expenditure requisite to produce them.

That level and straight lines are desirable for Railroads, no one will dispute; but every advantage has its value, and may be purchased too dearly. We are convinced, that by admitting a certain degree of undulation, accommodated to the natural inequalities of the ground, very large savings might have been effected in many existing lines, without introducing any serious impediments to their working properties.

We may observe also, that by thus reducing the depth of cuttings and the height of embankments, many of those unforeseen and contingent expenses, which so frequently cause the actual cost of construction so much to exceed the estimated cost, would fall within much narrower limits; for it is in these heavy parts of the work that such contingent expenses most commonly occur.

5th. Another source of extravagant expenditure arises from the haste with which these works are frequently pushed forward; which is such, in many cases, as to require day and night work, and many other heavy extra charges.

6th. Short lines are frequently rendered expensive by their requiring a greater proportional number of stations, warehouses, workshops, and other establishments; these always forming a large item in the general cost of construction.

7th. The nature of the country frequently presents difficulties, only to be overcome by an expenditure in the formation of tunnels, cuttings, embankments, bridges, &c., so immense, as in many cases not to be justified by any well founded calculation of income to be derived from the expected traffic on the line; for this must also be immense in proportion, in order to return to the proprietors a remunerating profit.

We have no hesitation in stating, that if these great and absorbing expenses cannot be avoided in Ireland, there is but little prospect of a general Railway system being attended with either private or national advantage.

It has been seen, however, that we have an instance of an English Railway executed in the best manner, having appointments of the first order, and supplied, through half its extent, with a double line of rails, which has cost only £10,000 per mile; and we have no doubt that this may be done in Ireland. But that it may be so generally, it will be requisite that some provision should be made by the Legislature for reducing the great expenses hitherto commonly incurred in obtaining Railway Bills.

It is much to be desired that the Irish proprietors, looking to the great importance of a general Railway system, and to their own permanent interest, will be moderate in their demands for land and compensation; but as we can hardly expect that feeling to prevail in every instance, it must, we conceive, be provided by some legislative enactment, that a just and reasonable compensation only shall be granted (see Appendix No. II.). The utmost economy must also be observed in conducting the works; no unnecessary expense must be admitted for the mere attainment of an ideal perfection; single lines of way must be adopted, till increasing traffic shall call for an increased accommodation, and all lines presenting great natural impediments must be laid aside.

All these conditions being complied with, we have no doubt that in Ireland £10,000 or 12,000 per mile may be generally made to cover all the charges of construction and appointments, and, assuming these sums, we have endeavoured, in a subsequent page, to ascertain what must be the amount of daily traffic requisite to bear the expenses of working and maintaining, so as to yield a fair remunerating return to the proprietors.

But it is proper to observe in this place, that in order that the cost of construction may fall within these limits, considerable modifications must be made in the gradients exhibited on our engraved sections. These lines were laid down by Mr. Vignoles and Mr. Macneill, before the Traffic returns were completed; their attention, therefore, was directed to one object only, that of making the lines as nearly perfect in a mechanical point of view as possible. When, however, our traffic returns were formed, it was found that unless considerable reduction could be effected in the cost of construction, all thoughts of a general Railway system in Ireland must be abandoned.

A careful examination of the lines and estimates was accordingly undertaken by us, and we thus ascertained, that by a very inconsiderable loss of mechanical power, and without in any respect interfering with the working capabilities of the lines, that is to say, without the introduction of any gradient, exceeding the limit in the original sections, (of 16 feet to the mile) a saving of nearly a million sterling might be effected in the construction of the south and south-western lines only, and a very considerable one on the northern lines.

Having, in consequence, made our views known to Mr. Vignoles and Mr. Macneill, they furnished, at our request, a second set of estimates, corresponding to a new order of gradients, more consistent with our anticipated return; these show a much greater reduction, the particulars of which are given in their Reports, (see Appendix A, No. 1, and No. 4.)

We have not, however, thought it necessary to engrave these new gradients, except on the diagram sections, because we cannot help thinking that in estimating the saving at £1,750,000, they give rather an exaggerated idea of the degree to which the principle of reduction might be carried, particularly as regards the Southern Line. In truth, the ultimate determination of the gradients of a line, which ought always to have reference to the anticipated traffic upon it, must be considered as forming a part of the detail operations, as in fact they generally do, for we believe very few existing lines have been formed without considerable deviations in this respect from the Parliamentary Sections.

In order to determine the most appropriate scale of gradients in any case, some principle must be established for estimating the mechanical impediments which these planes present; a subject on which engineers are by no means agreed. One reckons, that to ascend twenty feet, whatever may be the slope, is equivalent to lengthening the line one mile; while another asserts that such ascent leads to no mechanical loss; because "what is lost in ascending is gained by descending." Others again take an intermediate position, and make the loss depend not only on the total ascent, but on the degree of inclination, and on the amount of the load.

We have therefore thought it right to give our attention to this question, and our remarks on the subject will be found in Note E, already referred to.

After having indicated, as above, the sources of the enormous expenses frequently incurred in the construction of lines of Railway, it is only necessary for us to repeat what we have already stated, that they must be all, as far as possible, avoided in Ireland, in order to insure a remunerating return on the money expended in their execution. We have particularly referred to the expenses incurred by aiming at very level lines; a practice which has been carried to such an excess as (besides its unnecessary cost) to become an evil, by the interruption and difficulty it creates in draining the works.

To obtain the straightest possible line is another of the supposed tests of perfection on which great cost has been bestowed. Experience, however, has shown that curves are not so injurious as was at first imagined; and this fact, now established by practice, should be taken advantage of, to avoid passing through expensive localities, such as ornamental demesnes, the centre of towns, cities, &c. We have no doubt, that even in Ireland, by the Engineer showing himself more independent and indifferent to the adoption of the straightest line, many proprietors who, under other circumstances, would seek for compensation, will be solicitous to bring the line through their properties, and contend with each other in offering advantageous terms of accommodation.

We will also repeat, that strength and durability must alone be aimed at; and all unnecessary works of ornament scrupulously avoided.

These and some other charges are within the control of the Directors of a Company: there are, however, others to which they are exposed in obtaining the Bill, which are beyond their control. On this head we have offered some suggestions in Appendix No. II., to which we refer, our attention and remarks in this place having reference to the expenses of construction only.

Cost of Working and Maintaining by Locomotive Engine Power.—The next important question which called for our particular attention was the cost of working and maintaining a line of Railway; to arrive at this information, application was made to the Directors of several existing lines, and in Notes B and C we have given several official documents which sufficiently indicate the general amount of expense attending the working and maintaining a line of this kind. From these it appears, that commonly these expenses together absorb about four-sevenths of the income. This proportion we have found to be nearly uniform in Railways, which differ very considerably from each other in respect to their locality, and the nature of their carrying trade. The Liverpool and Manchester Line is one of mixed traffic; that of Dublin and Kingstown is almost entirely a passenger line, so also is the Antwerp and Brussels Line; all of them giving nearly the same ratio, and agreeing likewise in another important point, viz., they are all lines of considerable traffic.

This is a consideration which must not be lost sight of, when we are endeavouring to estimate the cost of conveyance on a line of Railway, and the advantages of it in comparison with the usual road or canal traffic, from which it differs in this respect, viz., that it can never be worked to advantage without an almost overflowing traffic of goods or passengers.

On a common road the expense of conveyance is always proportional to the loads conveyed: that is, if there are more goods or passengers than can be carried by one vehicle, two or more such vehicles may be employed, the increase proceeding by small steps or gradations; and it is the same on canals, although the steps are somewhat greater. In Locomotive Railway practice, this is not the case; it is impossible to do business at all in a small way. It is the opinion of those who are best qualified, by experience, to form a correct judgment, that there is scarcely any line in England which would have been profitable, if the first practice of small engines and small loads had not been superseded by the employment of larger and heavier engines.

The general run of new engines, at this time, vary in weight from 10 to 13, or more tons, and the quantity of goods which the largest of such engines is capable of transferring from one point to another, in the course of a day, is very considerable for any given distance.

If we take, for example, a line of 10 miles, a single engine would go and return four times in a day, and moving upon a level at a speed varying from 10 to 16 miles per hour, would, each time and in each direction, carry 180 tons gross, or 120 tons of effective load;* that is, it would be capable of transferring 480 tons of goods from each end of the line to the other in a day, and if the line were four times as long, or 40 miles in length, four such engines would still perform the same proportion of duty for the whole line.

But, unfortunately, in Railway practice, the carriage of any less load than 480 tons would be liable to the same charge for working and maintenance, or very nearly the same as the whole, whereas in road or canal traffic, 100 tons, or even 20 tons per diem might be carried at the same expense per ton as 480

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* The waggons being taken as equal to one-half the net load.

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We have endeavoured to ascertain the annual expense of working a locomotive engine, and have received statements from different lines, which vary according to circumstances, such as the amount of wages, and particularly the price of the fuel, and the speed. On coal lines, where engines burning coal are employed, and only speeds of six or eight miles per hour are required, the annual expense is not more than £700; but engines burning coke, incur a charge, varying from £1200 or £1500 to £2000 per annum.*

In Ireland there are few coking coals,† and we must, therefore, take the highest expense for fuel, and if we take also velocities of about 20 miles per hour, we ought not, perhaps, to assume the expense at less than £2000 per annum for passenger trains, and £1500 for luggage trains, moving from 12 to 15 miles per hour; or a medium charge, per engine, of £1750 per annum.

The next question is, what proportion does the charge for engine power bear to the whole expense of a line. In looking to existing lines, there is a great difference in this respect. On the Liverpool and Manchester Railway the locomotive expense is little more than one-fourth of the whole; but here the total charge includes the removal and delivery of goods, and a proportionally greater charge is made for the tonnage carried, which ought not to be included in our estimate, according to the view we are taking of the case, which has reference only to the expense of transfer between the termini, or between one station and another. On the Dublin and Kingstown Line, which is entirely for passengers, the whole expense is less than double the locomotive cost; other lines give a different ratio, falling, however, between these. Considering, therefore, the Irish lines as of a mixed character, we may, perhaps, assume, that with a traffic of medium extent, the whole expense will be about three times that for locomotive power only; or, considering the carriage disbursements to amount to about half those for locomotive power, which is nearly the proportion on the Liverpool, we may reckon the two charges together to amount to about half the whole expense on the contemplated Irish lines.

Now the expense of working each engine being taken at £1750 per annum, and the carriage and other expenses attending the motive, at £875, the whole charge per engine will be £5250 per annum. The medium day's journey of an engine may be estimated at 80 miles; therefore, assuming a charge of 2*d.* per ton, and excluding Sundays, the expense of working an engine will be covered by its carrying through the whole distance a net load of 25 tons: all that it takes beyond this will be applicable towards a dividend on the capital expended.

Cost of Working and Maintaining by Horse Power.—The foregoing estimate of expense and revenue, has been made on the supposition, that the lines are to be worked by locomotive power; and there can be no question as to the economy of this power as compared with horse power, in any case where there is traffic to give sufficient occupation to the engine. It has been seen that a locomotive, which costs £1500 per annum to work it, is capable of drawing 120 tons net, 80 miles per day, or 500 miles per week, and this work it will continue to perform for two years, with only small repairs, before it is necessary to remove it from the line for substantial reparations or replacement. But the question here is not what such an engine is capable of performing; but, having found the least amount of traffic that will barely pay its expenses, what would be the cost of horse power to perform the same duty? We question much whether even in Ireland, where horse power is comparatively cheap, it would be a profitable undertaking to form a Railway with a view to its permanent working by that means; but it is important to inquire whether there may not be lines likely to open the resources of the country, although they should not in the first instance furnish adequate employment for a locomotive, which might be advantageously worked by horses, till increased traffic should call for the more economical power of the engine.

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* We believe, that at a speed of 30 miles per hour, it has been found that the expense of locomotive power alone is 2*s.* 3*d.* per mile, which, at 80 miles per day, and exclusive of Sundays, amounts to £2807 per annum.

† They are only found in the neighbourhood of the Arigna Iron Works, in the counties of Leitrim and Roscommon.

This inquiry is very simple. We have seen that the least cost of working an engine in Ireland cannot be taken at less than £1500 per annum; we have, therefore, only to compute what amount of tonnage might be transferred a distance of 80 miles daily by horses, for 313 days, at this cost.

The result will, of course, depend greatly on the speed; but we will assume the most favorable pace for a draught horse, viz., about 2½ miles per hour. At this rate, a horse of ordinary strength will draw with a force of 100 lbs., and continue his work to a distance of 15 miles per day, for six days in the week; such a horse would, therefore, draw on a Railway, the friction being $\frac{1}{280}$th, a gross load of 28,000 lbs., or about 12½ tons; or two such horses, 25 tons; which is equivalent to 16⅔ tons net load. Now, in Ireland, two horses and a driver may be estimated at 5*s.* per day; the cost of conveyance, therefore, of this load for 80 miles would be 26*s.* 8*d.*, and to transfer such load daily, for 313 days, would cost £417 6*s.* Hence the load that might be carried for £1500 per annum, is found to be only 60 tons per day. This is, however, exclusive of the charge for road repairs, which would be less for horses than with locomotive power.

It follows, therefore, that allowing a rate of travelling of 2½ miles per hour, the expense of horse and steam power would be equal when the traffic amounted to 60 tons per day, in one direction, for a distance of 80 miles; or 60 tons out and home on a line of 40 miles; or 120 tons out and home on a line of 20 miles; or to 240 tons out and home on a line of 10 miles; that with a greater traffic the advantage would be on the side of locomotive power, but with less traffic on the side of horse power. There is, however, this important consideration, that in one case the rate of motion is 10, 12, or 16 miles per hour. and in the other only 2½ miles, and therefore appropriate to heavy luggage only.

It may be observed, that we have made no allowances for the ascent of gradients; but the fact is, that our estimate of the capabilities of a horse is drawn from the usual road duty, and includes, therefore, the increase of draught due to the usual road acclivities. The real power of a good horse is assumed commonly as equivalent to a draught of 150 lbs., 20 miles per day, at 2½ miles per hour; whereas we have taken it as 100 lbs. 15 miles per day.

The comparison is by no means so favorable to horse power, if we take the quick coach rate of 10 miles per hour. At this speed, a horse can only draw with a force of 37½ lbs., and can only go 10 miles per day. Indeed, it is commonly estimated, that a quick day coach requires for its service, a horse per mile, which is giving to each horse only a duty of 8 miles per day. We will assume, however, that he is able to continue his duty at 10 miles per day, and exert a power of 37½ lbs. at the rate of 10 miles per hour; and, moreover, that we are still enabled to perform the duty with a man to two horses. Comparing the cost at these two speeds, we have in the first case, for the daily horse duty, 100 lbs. × 15 miles = 1500, and in the second, 37½ lbs. × 10 miles = 375.

The cost is, therefore, four times as great in the latter case as in the former; or the cost of horse and of steam power becomes equal at a net load of 15 tons per day, on a line of 80 miles, or 15 tons each way on a line of 40 miles, or 30 each way on a line of 20 miles, or 60 out and home on a line of 10 miles. Still, however, on a line of mixed traffic, when the passenger accommodation requires only one or two coaches per day, it may be possible to work most economically with horses, particularly on short branch lines.

In coming to this conclusion, we must guard against being misunderstood. We do not thence intend to infer that in any case it would be advisable to construct a Railway with a view to its being permanently worked by horses (at least as a part of a general system); all that we are desirous to enforce is, that where there is a fair prospect that increased facilities will lead to increased traffic, it will be more economical in some cases to commence with horse power, till that increase shall be such as to call for the more powerful aid of the locomotive engine. A remarkable instance of this kind will be seen in Note A, in the case of the Dundee and Newtyle Railway.

It would be possible, in case of working by horses, to reduce, in some measure, the cost of construction, by using, in the first instance, lighter rails. This saving, however, would be but small and worthless in comparison to the whole expense. The cost of a single line of rails for locomotive working

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would be, at the present price of iron, (reckoning 50 lbs. to the yard,) about £550 per mile; or, for the two lines of way, £1100 per mile: and the utmost that could be saved by reducing the weight would not be more than £400 per mile; or, considering one-fourth of the way as double, it might amount to £500 per mile; too inconsiderable a part of the whole to justify the temporary adoption of light rails, which must ultimately be replaced, in case of increased traffic, by others of greater strength, and of course at a great additional expense.

3. RETURNS DERIVABLE FROM DIFFERENT AMOUNTS OF TRAFFIC.

There is reason to expect that the lines we have recommended may be executed and appointed at a charge not exceeding £10,000 or £12,000 per mile; it will be well, therefore, to exhibit in a tabulated form the result of a computation, showing the dividend or loss to be anticipated, with different amounts of traffic in passengers and luggage, taking the average of the former at 1¼*d.* per person per statute mile, and the latter at 2*d.* per mile. This charge is very low, but it is assumed as a fair average for Ireland; for although on a certain description of goods the greater sums of 3½*d.* or 4½*d.* per ton per mile, might be charged, this would scarcely more than balance the drawback it would be necessary to allow upon agricultural produce, brought from places not immediately in the vicinity of a Railway station, according to the practice adopted by some canal companies, to induce the farmers to avail themselves of water carriage.

In this computation, we begin by supposing only sufficient employment for two engines, for 80 miles, one from each end of the line per day; we then suppose sufficient for three, then for four, &c.; but as in these cases of deficient trade, the proportion of expense given in a preceding page, will not apply, we assume, till the number of journeys amounts to four per day from each end, the fixed expenses of the line to be £262 10*s.* per mile per annum,* and the whole expense, this sum *plus* the working expense of the engines and carriages, reckoning each engine and train to cost £2,625 per annum. We also assume medium loads of 50 tons or of 80 persons, although the capabilities of the engines are of course much greater, but the means are thus taken to balance the effect of occasional deficient loads or of returning sometimes without any load. The result is as follows: the table being computed for a line 80 miles in length, but the numbers will be the same for a line of any length, provided only the number of engines employed be such, as to give to each a duty of 80 miles per day.

TABLE showing the Gain or Loss to be expected, according to different amounts of TRAFFIC, and at different Costs of Construction.

Total Engines employed.	No. of Engines from each End.	With Luggage only.		With Passengers only.		Mixed Traffic, Passengers & Luggage.		Dividend per cent., the cost of Construction being £10,000 per Mile.	Dividend per cent., the cost of Construction being £12,000 per Mile.
		Tons per Engine from each End	Total per Day from each End.	Passengers per Engine from each End.	Total Passengers per Day, each way.	Luggage.	Passengers.		
		Tons.	Tons.					Per cent per Annum.	Per cent. Per Annum.
2	1	50	50	80	80	25	40	Loss 0.67	Loss 0.56
3	Alternately 2 and 1	50	75	80	120	37½	60	Dividend 0.30	Dividend 0 25
4	2	50	100	80	160	50	80	1.25	1.06
5	Alternately 3 and 2	50	125	80	200	62½	100	2.25	1.87
6	3	50	150	80	240	75	120	3.23	2.70
7	Alternately 4 and 3	50	175	80	280	87½	140	4.20	3.50
8	4	50	200	80	320	100	160	5.18	4.32

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* It is difficult to fix this expense with any degree of certainty; it embraces every charge except that appertaining to the locomotive engine, the carriages, and their attendants, viz., the salary of the resident Engineer, Secretary, Superintendents; the wages of porters, messengers, station-keepers; turn-plate and signal men; assessments in passing through parishes; expenses attending the supply of water and fuel at the fuel stations; the repairing all buildings, such as warehouses, workshops, and stations; also bridges, culverts, and viaducts; keeping in repair the drains, slopes of cuttings and embankments; the chairs, rails, and road, packing blocks, &c. &c.

4. PROBABLE DIVIDENDS FROM THE PROPOSED LINES.

In order to form an estimate of the probable returns which would be yielded by the income derivable from these lines, after defraying the expenses of working, maintenance, and repairs, it will be necessary to divide them into distinct portions, viz.:—first, of the whole trunk; secondly, of the branches separately; and lastly, of the whole combined system.

South-western Line.—The length of the Main Trunk Line, from the zero of mileage, is 166½ miles; and the equivalent number of persons carried on it one mile, in one direction, is 13,750.—See estimate, page 23. Dividing this number into the primary and secondary classes, as explained page 24, we have,

Principal Class,	8,227	Secondary,	5,523
Add 100 per cent.,	8,227	Add 50 per cent.,	2,761
	16,454		8,284
	8,284		

Road Passengers, with increase,	24,738
Posting, &c., one-fourth,	6,185
Small Parcels, &c., one-tenth of present traffic,	1,375
Total in one direction,	32,298
	2
Total in both,	64,596

64,596 at 1¼*d*.,	£336 8 11	Daily revenue from Passengers.
14,592 tons of Merchandise at 2*d*., as deduced from the estimate, pages 16, 17,	121 12 0	Daily income from Merchandise.
Total daily receipt,	458 0 11	

The above daily traffic is obtained by dividing the annual traffic by 365; it is, therefore, an average for every day in the year; but, supposing it to be all carried on 313 working days only, viz., exclusive of Sundays, the passenger traffic would be equivalent to the power of 11.6 engines, the duty of each being accounted 80 persons, 80 miles per day; and the merchandize at a duty of 50 tons, 80 miles; or 4,000 would require the aid of 4.1 engines, or 16 engines on the whole line, which may be considered equivalent to about 8 engines on 83 miles; and which, therefore, by our Table, page 60, shows a dividend of 4.32 per cent., at a cost of construction of £12,000 per mile; or of 5.18 per cent., at a cost of £10,000 per mile; or of 4.75 per cent., at a mean charge of £11,000 per mile.

In this statement it is not to be understood, that eight engines will pass daily between Cork and Dublin, but that that amount of duty will be daily required on the whole line. On some divisions four or five trains may leave each end per day, while in others two per day, or even occasionally only one may be required; but it is impossible in this stage of the inquiry, to enter into this detail, nor is it necessary so long as we are in possession of the amount of duty required on the whole distance.

Of course, those parts of the line on which the greater number of engines pass, will be the most profitable, and would be gladly undertaken by private Companies; but it is essential, for producing the greatest national advantages, that the gain on the more profitable parts should be available to bear the loss of others of deficient revenue, provided only, that on the whole a fair remuneration for the capital invested can be derived from the undertaking.

This result, however, has reference to the Trunk Line only; let us now inquire what effect will be produced upon it by the branches.

1. *Kilkenny Branch.*—The length of this line is 26½ miles. The number of persons carried upon it one mile is 813; this divided into primary and secondary, with the increased per centage added, as also for posting and parcels, the result is equivalent to

4,076 persons, 1 mile, at 1¼*d*., (6 days per week,)		£21 4 7½
2,709 tons, at 2*d*.,	ditto,	22 11 6½
Daily receipt,		43 16 2
Annual receipt,		13,712 10 0
Annual cost of working with one engine,		9,581 5 0
Surplus,		4,131 5 0

Cost of construction 26½ miles, at £8,000 per mile, £212,000: yielding, therefore, a dividend of only 2 per cent.

2. *Limerick Branch.*—The length of this line is 35¼ miles. The daily revenue for passengers, deduced as in the preceding case, is

4,341, at 1¼*d.*, (6 days in the week,) . . .	£22	12	2½
Merchandize, 3,655 tons, at 2*d.*, ditto, ...	30	9	2½
Daily receipt	53	1	5
Annual receipt	16,602	18	9
To work this line with two engines will cost, . .	14,634	0	0
Surplus, ...	1,968	18	

To pay a dividend on £286,000, about 7/10 per cent.

Taking the whole of the Main Trunk and Branches, viz.:—

166½ miles, at £11,000 per mile, . . .	£1,831,500
Kilkenny Branch, ...	212,000
Limerick do., ...	286,000
Total charge of construction, . . .	2,329,500
Total surplus, ...	82,137

Yielding a dividend on the Trunk and these two Branches, of about 3½ per cent.

We have not felt ourselves justified, with our data, in assuming a larger proportion of revenue from these branches than is given above; at the same time, there certainly appears strong reasons to anticipate a greater amount of traffic on these lines than our present numbers seem to indicate, and it is important to observe that all additional traffic that may be drawn to the branches which at present pass by other routes to Dublin, will tend greatly to increase our estimated revenue derivable from the Main Trunk.

It still remains for us to furnish the probable effect of the proposed line from Limerick to Waterford.

3. *Waterford and Limerick Branch.*—First, the distance between Waterford and the junction of the Cork Line, 37 miles, will cost for a single line, at £8,000 per mile, £296,000.

Estimated traffic upon it, allowing 25 per cent. increase on Lieutenant Harness's estimate, is, per day, . .	£50	15	0
Annual Revenue, (at 6 days per week,) . . .	15,877	10	0

Again, the distance between this junction and that of the Limerick Branch, is 13 miles, the cost of construction for a single line, £104,000.

Income from the same, allowing 25 per cent. of Lieutenant Harness's estimate, is, per day, . . .	£24	19	6
Income, per annum, (at 6 days per week,) . .	7,812	10	5
Proportional traffic on the Limerick Branch, from the last junction to Limerick, per day, . . .	34	13	0
Do. per annum, ...	12,647	5	0
Total annual income, ...	36,337	5	5
Annual Cost of working the Branch, (3 engines,) . .	21,000	0	0
Surplus, ...	15,337	5	5
Cost of construction, (the Limerick Branch being supposed already formed as a part of the former system,) .	400,000	0	0

Yielding, therefore, a dividend on this part, of 3.8 per cent.

4. *Northern Line.*—It appears by the estimate, page 25, that the equivalent daily receipts for Passengers and Merchandize are as follows:—

64,628 Passengers, at 1¼*d.*, (6 days per week,) .	£336	12	1
7,955 Tons, at 2*d.* ditto, .	66	5	10
	402	17	11
Whole annual receipt, ...	126,106	7	11

The Passenger traffic is equal to the duty of 10.1 engines, and the tonnage to 1.9 engines; total for both, 12 engines, on the 121 miles, being equivalent to nearly 8 engines on 80 miles, and therefore by Table, page 60, the dividend will be 4.32 per cent. at £12,000 per mile, or 5.18, at £10,000 per mile: mean, 4.75, at £11,000 per mile.

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INQUIRY INTO CIRCUMSTANCES PECULIAR TO THE SITUATION OF IRELAND, AND THE PRESENT CONDITION OF ITS INHABITANTS, WHICH WOULD RENDER THE PROMOTION OF THESE WORKS, OR ANY OF THEM, AN OBJECT OF NATIONAL IMPORTANCE; AND INTO THE MEANS BY WHICH IT MIGHT BE NECESSARY OR ADVISABLE TO PROMOTE THEM.

I. AS TO SITUATION:—DOES IRELAND, AS COMPARED WITH ENGLAND, OFFER ANY PECULIAR FACILITIES FOR A STEAM COMMUNICATION WITH AMERICA?

If this question were limited to the mere consideration of the facility with which a voyage could be made from port to port, the answer must necessarily be in the affirmative; for not only are the southern and western harbours of Ireland nearer to America in lineal distance, but they are also more favourably situated, as regards the prevailing winds and currents of the Atlantic. This fact, indeed, has been so thoroughly established in the Parliamentary Reports on the Western Harbours of Ireland, in 1834, and in the First and Second Reports on the Public Works of Ireland, as to render any further inquiry on the subject, in this place, quite unnecessary.

A saving in distance is always an object of importance in steam navigation; but it is of peculiar value where the entire voyage is supposed to verge on the point which will scarcely admit of the carriage of sufficient fuel, exclusively of any other cargo.

But the subject includes a wider range of inquiry, than that which depends on the distance from point to point: it involves also a consideration relative to the amount of probable traffic, and how far it may be such as to counterbalance the disadvantages of a more remote position.

Viewing the state of Ireland as previously described, and the well known resources and extent of trade from several ports in Great Britain, the conclusion is inevitable, that the freight, whether in passengers or goods, will be almost exclusively from the latter. The inquiry will, therefore, resolve itself into these three queries:—

First—Whether the superior facilities afforded in departing from Ireland are sufficient to compensate for the expense and inconvenience of a conveyance of the freight through Ireland to a port of departure.

Second—Whether, on the contrary, it would be more advantageous to embark in Great Britain, and make the voyage direct from thence. Or,

Third—Whether a medium course might not be advisable; viz., that steam vessels should take in the bulk of their cargo, fuel, &c., in Great Britain, and touch at an Irish port for a portion of their passengers and cargo, fuel, and other sea stores.

With regard to the first point, we see no reason to suppose that vessels departing from any port of Ireland, for general purposes, could, under the existing circumstances of the country, compete in any way with those leaving Great Britain direct. Ireland has itself little or no traffic with America, and the cost and inconvenience of transit would be far too great for a conveyance by land across it.

The answer to the second question is naturally involved in that of the first, turning entirely on the practicability of making the direct passage from England, which is examined in a subsequent page.

The adoption of the third course would be influenced by the degree of importance attached to the additon in the stowage of freight, which would in such case, be obtained by the reduction in the stock of fuel—by the probability of obtaining passengers and goods in Ireland—affording additional accommodation to the passengers in general, and by considering how far these advantages would compensate for the delay and prolongation of the entire voyage, occasioned by touching at an intermediate port.

We think it probable that vessels from Liverpool or Glasgow, would find in the supply of fuel alone a good reason for touching at the most convenient port in Ireland, (such a port as would be far to the westward, without being much out of their course;) and if advantages were experienced by passengers in embarking at the same port, the inducement would be greatly increased.

But this latter motive cannot be expected to operate at present, for the time of travelling to such port by the common road, would be nearly the same as in going by sea, while the trouble, fatigue, and expense would be much greater.

With regard to vessels from Bristol, the policy of touching at an Irish port (probably at Cork) admits of a greater doubt—the length of voyage between the two places seldom, perhaps, exceeds twenty-six hours; yet a reduction in the stowage of fuel even for that distance will admit of an additional freight of as many tons. There are also other Irish ports still more westward, but very little out of the way; and should it be found that the final embarkation from Ireland would be attended by a general gain of time, or other accommodation to passengers, the vessels from Bristol may find it advantageous to touch there; but altogether, in reference to the actual condition of the country, the selection of a western port in Ireland does not appear to be a consideration of great importance.

We are led, then, to the main point, as regards our particular subject of inquiry; namely, how far these circumstances would be altered by Railways.

In order the more fully to ascertain the particulars that might influence the determination of this question, we thought it necessary to be prepared to show, in a general way, how the principal ports that have been suggested for such an object, namely, Cork, Berehaven in Bantry Bay, Valentia, and the Shannon, might be reached by Railways; and what influence each of these lines respectively might have upon the general condition of the country.

With this view (Cork being included under other arrangements) we caused exploring surveys to be made of a Line to Berehaven, and of an extension from Limerick to the lowest available anchorage on the Shannon at Tarbert;* and Mr. Vignoles was enabled, from a previous examination, to point out the Line for Valentia.

These are severally described in Mr. Vignoles' Report, and the particulars of each are shown on the plans and sections, Appendix A, No. I.

The line to Tarbert is only 35 miles; the country through which it passes is favorable for its construction; the Shannon, as a port, has the advantage of an immediate connexion with the establishments of the influential City of Limerick, and an adjacent district of remarkable abundance and capability; and, moreover, with an inland navigation to Dublin, and with the entire navigation of the Shannon.

The line to Valentia would require 74 additional miles of Railway, made expressly for it, over a country certainly not very unfavorable, and passing very near to Killarney, which might be expected to prove a place of some resort, could it be reached by a Railway, but otherwise the line is by no means adapted for internal traffic. On the merits of the Port of Valentia some difference of opinion exists.

Of the very superior qualities of Berehaven, as a port, there is no question whatever; a Railway to it, however, would be a work of much difficulty and expense, and would present but small proportionate advantages to the country, from which, again, it would derive but little support.

Both Berehaven and Valentia are far removed from any existing establishment, or from the resources that might be useful to a station of departure for America. As a simple packet station, any great resources might not be of very much importance, but it would hardly be considered expedient to incur heavy expenses for a national object of that nature, without, if possible, combining with the packet service, the promotion and acceleration of other means of intercourse essential to the general service of the Government, and to the purposes even of mercantile transport.

Of these four stations, Cork is the only one whose situation and traffic have been found such as to justify us in recommending its connexion by a Railway with Dublin, on considerations of internal communications only, while at the same time, it unites the advantage of being a port conveniently situated for vessels to call at on their voyage from Great Britain; and the question is, therefore, whether these advantages can be counterbalanced by that which alone can be claimed for the others, namely, their being farther to the westward, and, consequently, nearer to America.

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* Kilrush is six miles lower down the river, but being on the Clare side, is not to be reached by Railway without a considerable detour, and the necessity of crossing the rivers Shannon and Fergus.

Tarbert is 46 miles to the west of the entrance of Cork harbour; Berehaven, 69 miles, and Valentia 87 miles.

The considerable extra cost which would be required for the construction and maintenance of Railways, either to Berehaven or Valentia, with their small comparative advantages as means of internal communication, and the trifling gain which would be effected in distance over Tarbert, whilst in consequence of the increased length of Railway journey there would be but little gain in point of time; as well as their remote situation and distance from establishments or resources, induce us to dismiss all further consideration as to those places, and narrow the question to an inquiry into the relative merits of Tarbert and Cork.

Tarbert would be about the same distance by Railway from Dublin, or, perhaps, a trifle nearer than Cork, and would enjoy similar advantages, in having in its neighbourhood large existing establishments and resources; but its adoption would require 30 miles of additional Railway; improvements should also be made to the port, which would, after all, be completely out of the course from the ports of England and Scotland. We think that these considerations for the present, more than counterbalance the saving of 46 miles in the voyage.

We therefore recommend, that no other measures be taken, in the first instance, with regard to establishing a western port for this purpose, than such as may be necessary for improving, to the highest degree, the means of communicating with Cork.

We have stated that there would be many inconveniences and no advantages attending the conveyance, at present, of passengers or goods from Great Britain through Ireland, to meet vessels touching at a southern port; but if Railways were opened in the most advantageous directions through both countries, for the whole extent of the land travelling, and if the passage across the Irish Channel were accelerated, the balance of advantages might be entirely altered.

To enter into some calculation on this question, let us suppose the line of Railway we recommend from Dublin to Cork to be executed, and the most rapid possible communication opened between London and Dublin. Persons or packages might then reach Cork from London in about 29 hours (allowing 20 miles per hour for Railway travelling), while a steam vessel would be probably three days in completing the same distance; and if another day be added in the latter case, for insuring a fixed time for final departure from Cork, the very saving in time, amounting to two or three days, would at once secure the conveyance of the mails to be established by that route, and would occasion it to be greatly resorted to by passengers, as well on account of the additional available time which they would gain, as of the increased comfort and convenience which most persons would consider to attend that mode of conveyance. The only drawback (which would no doubt influence a portion) would be a small increase in the expense.

By the same train of reasoning it may be shown, that from Glasgow and Liverpool, two very important places (particularly the latter) as regards their connexion and intercourse with America, one or two days might be saved in like manner; while the facility would be still greater, and the expense proportionately less, of joining the vessels at Cork, than, (as shown in the preceding calculations) of the journey from London.

Bristol here again requires a separate consideration, as the advantages possessed by that port, which is in the most direct line from Great Britain, become more nearly balanced.

From London to Bristol by Railway, and from thence by Sea to Cork, would require usually about the same time, if any thing perhaps a little more, than by the supposed Railway route, and be more subject to occasional delays from adverse weather; yet, if the voyage were carried on direct, without touching at Cork, it would be a more simple proceeding, less expensive, and consequently, to persons proceeding from London, Bristol itself, and the south and west of England, it might be as convenient to embark at Bristol at once; but any person or package from Liverpool, or any place north of it, could be conveyed as easily to Cork as to Bristol, and be thus one or two days advanced on the route; and as the difference from London itself would be inconsiderable as a question of time, and the Railway might by many be preferred to the voyage, it is probable that regular passenger vessels, even from Bristol, would find it advantageous to touch at Cork; since by doing so, they might not only complete their stock of fuel, and thus gain the space for a few tons more of freight; but also, which would be an object of no less importance to the proprietors, they would be in a situation to take up passengers from the north, and some even from the Metropolis.

On this head, it must be recollected, that Liverpool has probably as large, if not a larger communication with the United States of America, than even London itself; it is also the line by which a considerable intercourse is carried on from the north of Europe, by way of Hull to America.

Indeed it is probable that neither London nor any port in the English Channel will be able to compete advantageously with the western ports of England and those of Ireland, in the business of steam navigation to North America.

Having thus endeavoured to explain that by the construction of the best lines of Railway between London and Dublin, and between Dublin and Cork, the latter being established as the fixed port of embarkation, a more certain, expeditious and convenient, if not a cheaper communication would be effected with America than from any port of Great Britain directly, unless with partial advantages from Bristol only; and that even from Bristol circumstances are likely to induce many vessels to touch at Cork. We may then safely urge the construction of these Railways as a consideration of national importance, quite independent of the amount of direct profit from increased business which the intercourse thus created is likely to produce. We have reason, moreover, to believe that the policy of adopting the greatest degree of improvement of which such undertakings are susceptible is not to be estimated by the simple calculations of the manner in which the intercourse between Great Britain and North America might be carried on. We know that it is a question of doubt still pending whether Havre or some other place in France, or a port of the British Empire shall henceforth become one of general resort for the business to America for a great part of the Continent of Europe, and a favorable result for our own country can only be obtained by the establishment of facilities manifestly superior to those of Havre or other French ports.

We have thus far considered the subject of this proposed method of intercourse with North America as of a mixed character, being equally adapted for passengers, goods, and letters; but if a periodical line of packets were established for the conveyance of mails and passengers with a few very light articles only, and that the question had no reference to the accommodation of vessels sailing from British ports, we consider that there would be advantages in fixing its permanent station in some port of Ireland, provided with a Railway communication; chiefly because, by reducing the length of the entire voyage, a smaller number of vessels would perform the service, with more certainty and safety, while at the same time the means of reaching such a port from any part of the empire would be perfectly easy. Should such a system hereafter be judged expedient, we are inclined to believe that perhaps Tarbert might be the most appropriate situation, as uniting the shortest distances including journey and voyage, the presence of existing large establishments and resources, a favorable port, and a great extent of Railway, well adapted to the purposes of internal communication.

But, on the whole, we consider that Cork, under present circumstances, will answer every purpose for which a western port can be required to promote a steam communication with America. It offers, however, at this moment, no other advantage than that of a port, where vessels may complete their supply of fuel previous to taking their final departure. But by the establishment of a Railway from Dublin to Cork, and also of the most improved and rapid Railway and Packet communication between London and Dublin, (which is also indispensable,) the intercourse with North America might be accelerated to the utmost degree, which it would be, as yet, prudent to attempt; and freed from some portion of danger and inconvenience. These are objects of so great importance, that we are induced to recommend most strongly, that every encouragement be given to the completion of those lines, on the best system, and under such arrangements as shall prevent private or partial interests from having a power to check a perfect co-operation in the means of transport throughout the whole.

2. INQUIRY INTO THE PRACTICABILITY OF A STEAM NAVIGATION TO AMERICA.

Although the experiments for effecting a steam communication with America are actually in progress, it may be some time before the difficulties and inconveniences that must be experienced at first, will be removed, and it may be consequently of some service to offer the few observations which, in compliance with our instructions, we had already drawn up, on the circumstances and principles affecting the practicability of the voyages by steam.

It is a subject which has been discussed with great earnestness by different parties; and statements, greatly at variance with each other, have been made in support of the one and of the other side of the question.

As it is necessary to have some determinate distance in view, we shall select Cork Harbour as a point of departure; for it may be observed, that if the voyage be practicable from that port, it will be so likewise from Berehaven, Valentia, the mouth of the Shannon, as well as from other western harbours of Ireland; and, on the other hand, the difference in any of these cases is so inconsiderable with regard to the whole distance, and the facilities for entering and leaving so nearly equal for steam vessels that we can scarcely consider the voyage as practicable from any one of these, and impracticable from Cork; besides, as we have already remarked, that if it be found practicable from Cork, it will be equally so from London, Bristol, or any other English port; because this may always be made the ultimate point of departure, where the vessel may receive her final sea stores, her coal, the mail, and such passengers as may prefer to join her at that place. Now, the distance from Cork to New York is about 3000 miles, and two questions present themselves in connexion with that fact, namely, "What is the greatest distance we may consider as falling within the present capabilities of the most powerful and best appointed steamers; and what increased capabilities have we a right to anticipate from the continued progress of that steady course of improvement which has hitherto accomplished so much?"

In the first place, without any reference to improved means, it may be stated as the result both of theory and practice, that the larger the steam vessel, or the class to which a steam vessel belongs, the greater (all other things being the same) is her capability for speed and length of voyage.

To look at the question first, theoretically, it is clear the means of stowage will be, at least, proportional to the tonnage, which latter will vary as the cube of the lineal dimensions of the vessel, while the resistance will only vary as the immersed section, which is as the square of those dimensions; consequently, if the power of the engines and consumption of fuel be made proportional to the tonnage, the speed will be greater, and the duration of the voyage in time being the same, the length of voyage as regards distance, will be in the same ratio as the speed.

On the other hand, if the power of the engine be only increased proportionally to the resistance, that is, to the immersed section, then the consumption of coal per hour being increased in a less proportion than the means of stowage, it is obvious that with the same velocity as before, the fuel will last longer, and the length of the voyage, both in time and distance, will be proportionally greater.

To illustrate this in numbers, and to show the effects of adopting the one or the other of these means, we will take a vessel of any given tonnage: as, for example, 835 tons, and assume her to have a certain medium rate of steaming, say eight nautical miles per hour, and that her fuel will last her 19 days, the whole length of the voyage being therefore 3648 miles (which are the numbers specifically stated by Captain Austen, of H. M. steam sloop Medea,* as exhibiting the capabilities of that vessel), and let us inquire what would be the capabilities of another vessel, on the same model, of 1670 tons, in point of distance, supposing, first, her power increased proportionally to

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* See Captain Austen's Report to the Admiralty, Note G.

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her tonnage, and, secondly, that it is increased proportionally to the resistance, or to her transverse section.

To double the tonnage of a vessel, preserving the same proportions, her linear dimensions must be increased, as 100 to 126, or as 1 to the cube root of 2.

Consequently her sectional area, or resistance at the same velocity, is as 100 to 158
And her tonnage, stowage, &c., - - - - - as 100 to 200

Now, in the first case, the power being as 200, and the area of resistance only as 158, the increased force per square foot of the section will be as 158 to 200, and the resistance overcome in a given time being as the cube of the velocity, the speed will be increased as in the ratio of the cube root of 158 to the cube root of 200, or as 100 to 108, and the length of voyage, in regard to distance, will be greater in the same proportion.

In the second case, viz., increasing the power of the engines only in proportion to the sectional area, the velocity will remain as in the former vessel; but the proportional consumption of coal will be less in the ratio of 200 to 158, and consequently, the length of the voyage in distance will be increased, as 158 to 200, or as 100 to 126.

Hence, the capabilities for distance, of a vessel of double the tonnage of the Medea, would be, according to the first arrangement, 3,939 miles; and according to the latter, 4,641 miles.

It may not, at first sight, appear obvious, how it happens that so great an increase of distance should arise out of this difference in proportioning the power of the engines, but a little reflection will show that a large proportion of fuel is expended in obtaining the last portion of any acquired velocity. In fact, speed is almost the only quality which has hitherto been considered worthy of attention in a steam vessel, the consumption of fuel having been seldom or never regarded. Nothing can be more obvious, however, than that great speed can be purchased only at a great cost. The resistance varying as the square of the velocity, to raise the speed, for example, from 8 to 9 miles per hour, requires an increased consumption of fuel in the ratio of 64 to 81, to go the same distance, and of 512 to 729, to steam for the same time; or, which is the same, to increase the speed one-eighth, requires an increased consumption of fuel of one-fourth, which necessarily leads to a great sacrifice in respect of capability for distance.

This result, although sufficiently obvious in a theoretical point of view, seemed to require confirmation by experiment; application was accordingly made to the Admiralty to permit a trial on one of the Government steamers, and the result fully confirms the above theoretical deduction.

The only means which presented itself of making the trial experimentally was by using the steam at a reduced pressure, viz., by reducing the pressure shown by the steam guage from 3¼ lbs. to 1 lb., or the whole pressure, including the atmosphere, from 18 lbs. to 15¾ lbs. With this reduction of power the velocity was reduced only from 8.08 miles per hour to 7.78 mile per hour. The number of strokes was reduced from 24½ to 23, and, therefore the effective steam power expended was, 18×24½ to 15¾×23, or as 100 : 79, the speed was reduced only in the ratio of 100 to 96.—(See Mr. Barlow's Report to the Admiralty, Note F.)

It appears, therefore, that in order to allow a vessel to perform the longest voyage with a given consumption of fuel, we must not urge her, on all occasions to the utmost of her speed; and there can be no doubt that as soon as the question becomes, "How to go the farthest," the ingenuity of our engineers will be as successfully employed in increasing the capabilities of a vessel for distance, as it has hitherto been in increasing it for speed.

Of course, the means of reducing the power above spoken of, viz., by reducing the steam pressure, is not supposed to be the best way of effecting the object; it was had recourse to in the experiment as the only one which readily presented itself; the same purpose would probably be effected in practice by using the steam more or less expansively; and we learn that this is proposed to be done by a peculiar construction, both in the engines for the British Queen, building for the British and American Steam Navigation Company, and by Messrs. Maudsley and Co., who are making those for the Great Western.

There is also every reason to expect that much will be effected in point of increased speed at the commencement of a long voyage, and during the voyage, without incurring an additional expenditure of fuel, by the invention of some ready means of reefing the paddles. At present, taking the most powerful of the Government steam vessels, as for example, the Phœnix, her immersion, with a full cargo of coal and sea stores, is between three and four feet more than at the end of the voyage when all are expended. Her paddle-boards, are, therefore, wholly immersed and smothered in the beginning of the voyage, in order that they may be at all efficient at the end of it. The consequence is, that an immense amount of power is thus expended, besides all the heavy shocks which the engine sustains by the boards striking the water at the most unfavorable angle.

Now, if means should be devised of remedying this evil by a ready method of reefing the paddles, there can be no doubt that at the commencement of a long voyage, the boards would be brought up two or three feet nearer the axle of the wheel, and be gradually expanded as the vessel became lightened; and that on other occasions, of favorable and unfavorable weather, as much skill would be exercised in managing the paddles, as is now employed on the sails and rudder, all which would tend to increase the capabilities of a vessel for the performance of a long voyage.

We are aware that certain forms of paddle wheel have been used, with a view to preventing the shocks the engine sustains in the cases to which we have alluded; but these consist of a number of moving parts, liable to derangement and accident, and difficult to repair, which seem to render them unfit for the performance of a long voyage. There are also other propositions for altering the form of the wheel, viz., by replacing the present whole paddle board by two or three narrow boards set in certain steps to meet the water at the most favorable angle, under the medium state of the vessel; and experiments are at this time being made at Woolwich, by order of the Admiralty, to ascertain the advantages of this proposition. We are, however, of opinion, that the great difference in the state of the vessel between her starting and the completion of a long voyage, requires that her paddles, whatever may be their form, should be adjustable according to circumstances, not only of the lading of the vessel, but of wind and weather.

It appears also, by recent experiments, made by order of the Admiralty, that great as are the improvements which have been made in the different parts of marine engines, and in the construction and appointments of the vessels, there still remains much to be effected, particularly in properly proportioning the size of the paddle boards to the power of the engine. From the experiments alluded to, it has been found, that by gradually reducing the area of the paddle board from 12¼ feet, to less than 8 feet, the speed of the vessel (the African) was at every step increased, and that it was only when the board was reduced to little more than six feet, that the speed began to decline, and even then it was greater than with the board of 12¼ feet. This result is certainly extraordinary, but it is no less true and important—while it shows how much still remains to be effected, and how much we have reason to hope for from the exertions and ingenuity of our engineers.

It may be observed, that the Admiralty, acting on the facts thus elicited, has ordered the African to be furnished with paddles consisting of two boards each, the whole area of which is only 6 feet 10½ inches; whereas the area of the former whole paddle was 12 feet 3 inches.

The Rhadamanthus has also had her paddles reduced by one-fourth.

There can be no doubt, therefore, that the paddle boards hitherto employed have been generally much larger than is required, and that vessels have been unnecessarily shaken, and the engines strained in consequence; for it appears that the reduction of this kind of motion is no less remarkable than the observed increase of speed.

We may remark, that the experiments above alluded to on the African, were made on the river Thames, and many persons, in consequence, felt great doubt as to the effect of such small paddles at sea. It is therefore satisfactory to us to be able to state, on the authority of a letter from Captain Beechy, R. N., who has now had several months' experience, that the boards have proved equally effective at sea. On one occasion a trial was made, by adding a third paddle to each radial bar, and the result was a considerable diminution of speed.

Improvements are likewise in progress in respect to the form of condensers, and in many other matters relating both to the vessel and the engine.

There are also other considerations to be attended to; the flues of the boiler will require cleansing; although, from some facts which have come to our knowledge, this is not so frequently necessary as has been supposed. We have instances of a vessel steaming for eleven days without cleansing her flues, and with but little diminution of draught; and it will be seen, by referring to the very valuable remarks of Captain Austen (Note G), that this operation is not essentially necessary more than once in seven days, or perhaps once during the voyage to America; and we understand it is proposed by Messrs. Maudsley and Co., to form the boilers for the Great Western in four distinct parts, at 18 inches distance from each other, which will allow of any one being thrown out of work, to be emptied, filled with cold water, and cooled down, so as to admit of its being cleansed, without its interfering with the working of the engine—a time being, of course, selected for this operation when the vessel shall require the least assistance from steam power. The same principle will also be followed in the boilers of the British Queen.

Weighing all these circumstances, and relying on the immense resources of mechanical skill which this country possesses, we can entertain no doubt that means will be speedily devised of economising the consumption of fuel, and of making the best use of that which is expended, so as to give to steam vessels a greater capability than is necessary for crossing the Atlantic; and that a voyage from Ireland, as the point of departure, to America, is already fully within the powers of steam navigation to effect.

We have hitherto spoken of a vessel as a steamer only, but it is to be presumed that she will gain much by the power of her sails. It appears, that the steaming powers of a vessel is by no means incompatible with her possessing good sailing qualities. Referring again to Captain Austen's Report, it will be seen, that "the sailing rate of the Medea, when on a wind, in a strong single-reefed top-sail-breeze and smooth-water, is 8 knots per hour, and in a moderate quarterly gale, 11½ knots;" and that "her tacking may be depended upon in strong breezes, in a sea way, fully equal to a sailing vessel of war, in light winds, when she has steerage way." Again it is stated, "In treble-reefed top-sail breezes, while cruizing with the squadron, we have been found to weather considerably upon them, showing the advantage of the great quantity of canvass spread in the fore and aft sails," &c.—(See Note G.)

There is, therefore, every reason to expect, even in an outward voyage, that a vessel properly constructed and rigged, will benefit greatly by her sails; and it is of the utmost importance that she should, in such cases, save her fuel, or use it in the most economical manner.

In the Medea there is an easy mode of disconnecting the wheels from the engine, and, under the most favourable circumstances, the former are let to run loose, and the engines stopped, but Captain Austen would prefer, if it were always practicable, to reef the lower boards, or to remove them. He also recommends, on other occasions, for the sake of economy, to employ, alternately, one engine and one set of boilers, with three fires, &c.; and a similar proceeding was adopted by Captain Oliver, of Her Majesty's steam Ship Phœnix, when he found that three-fourth speed was obtained with one-half the fuel: but the means provided in the engines, to which we have referred, will effect the objects here contemplated much more conveniently, by using the steam more or less expansively, as circumstances may require; and by a judicious application of these means, no doubt, great economy and great advantages will be obtained.

Being desirous of obtaining all the practical information within our reach on this important question, we have called for and have been supplied with a Report, at considerable length, from Lieutenant Davis, R.N., commanding H.M. Steam Packet, Gleaner, who has been accustomed to steam navigation for eighteen years. This Report relates to many points which do not properly belong to our inquiry, but in that part which relates to the capability of a steam vessel to cross the Atlantic, we find that it agrees with the Reports of Captain Austen, Captain Oliver, and others, in enforcing the condition of not urging the vessel to her greatest speed; of economising the consumption of fuel when the sails are available, and of saving the fuel altogether under strong adverse circumstances. We may remark, indeed, that Lieutenant Davis recommends the application of a lower amount of steam power than we have found to be the general opinion, but this is only a difference in degree, and not in principle. Of the capability of a vessel to perform the voyage, no doubt is entertained by any of the above experienced officers, provided only that the commander be a man of judgment, and one well acquainted, by practical experience, with steam navigation.

There will be, undoubtedly, considerable difference in the time between the length of the outward and homeward voyages; but without the light which experience alone can throw upon the question, it would be impossible to compute with accuracy what the amount of that difference may be: at present, with the sailing packets of the first class, between Liverpool and New York, the average time out, is 36 days, and home, 19 days. It will, of course, be much closer when steam is employed.

In order to form a probable estimate by comparison, we have ascertained that the mean time of our Mediterranean steam packets, between Falmouth and Cape Finisterre, is 74·4 hours, and from Cape Finisterre to Falmouth, 67.2 hours. The former being a mean of sixteen passages, and the latter of twenty passages. We have also obtained a return of the times of H. M. Steam Packets to and from Liverpool and Kingstown, for the first six months from January to June, 1837, both included, and it will be seen, by referring to Note I, that the difference of time is only 30 minutes, the mean time being 13 hours 15 minutes, and the mean speed for the whole time, 9 nautical miles per hour. Now, as the difference in these times, in both cases, is due to the prevalence of westerly winds, and as it is to the same cause that we must attribute the anticipated difference in the passage to and from Ireland and New York, we are perhaps justified in assuming, that powerful steamers, such as the British Queen* and Great Western, will perform her return voyage in 14 or 15 days, and her out voyage in 16 or 18 days.

We therefore repeat our firm and deliberate opinion, the result of the most careful and anxious inquiries, that a transatlantic navigation by steam between Great Britain and America is practicable, and that Cork is at present the most available Irish port of departure.†

3. ON THE MEANS OF EFFECTING THE MOST RAPID COMMUNICATION BETWEEN LONDON AND DUBLIN.

There is an obvious connexion and dependence between this object and that referred to our especial consideration, with respect to the navigation by steam vessels to America: it also claims attention, as being essential to the profitable working of Railways in Ireland, and calculated to promote the mutual interest of this and other parts of the British empire.

Before the introduction of Railways, great exertions had been used, and a considerable progress made towards rendering the communication between the two countries as expeditious as the means then available for the purpose would allow. Large sums were expended in improving the several packet ports of Milford, Dunmore, Donaghadee, Portpatrick, Howth, Holyhead, &c., and in bringing the Holyhead road to its present perfect state. The advantages thus obtained to the public were well worth the expense which had been incurred; but their acknowledged value and importance are not to be weighed against results now attainable by the application of a power which was unknown when those improvements were effected. The locomotive engine has, at one step, trebled the speed of ordinary road conveyance, at the same time that it combines the advantages of superior convenience, safety, and cheapness; and we are, therefore, naturally led to inquire whether that power should not be adopted, in order to complete the end and purpose for which those works were originally undertaken. Hitherto, as we have seen, no expense has been spared by the Legislature in adopting any practicable means of facilitating the intercourse between the two countries; and doubtless, the

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* The dimensions of this vessel will be found stated in Mr. Laird's Letter in Note H.

† It has been thought best to leave this part of the Report as it was originally written, although the question under discussion has been now successfully decided by the practical performance of the voyage.

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same principle will still be acted upon. It is the more reasonable to expect this, because, by an extension of the Railway system, the attention which hitherto has been necessarily divided in various directions, may be concentrated to one main point, namely, the attainment of the most rapid communication between the metropolis and Dublin; for if that object be effected, the communication with all the important towns in Ireland will be equally, and at the same time, facilitated—and that in a more perfect and economical manner than could be accomplished by any other management.

We shall not attempt to fix or define the utmost degree of expenditure which it would be right to incur for this purpose. The advantage that would result from merely expediting the Mails, so as to gain three or four available hours, in each direction, daily, can scarcely be estimated too highly. But we believe that it may be obtained at a cost not disproportioned to the object, and that a considerable direct return may be expected in addition to the benefits which would spring from the improved resources of this country.

With regard to a system of Railways for Ireland, any such attempt must depend so much on the support it would receive from British commerce and enterprize, that we should take a most imperfect view of the question unless we considered it in combination with the increased facility of intercourse it would afford with Great Britain generally, and with London in particular. It happens very fortunately that Dublin, which would naturally become the centre of Railway communications in Ireland, is that port which can be reached in least time from London, and which is, on all accounts, the most important to reach quickly.

4 PROJECTS PROPOSED FOR EFFECTING THIS OBJECT.

The principal information we have gained on this important subject is contained in an interesting Report by Mr. Vignoles, on different lines of Railway which could be carried through North Wales;* and in the Report of Captain Beaufort, R.N., Hydrographer to the Admiralty, on the Ports on the coast of North Wales, which might be adopted in connexion with such lines.

The lines of intercourse between London and different parts of Ireland, which are in existence, or have been suggested, are as follows:—

EXISTING LINES.

To Dublin,	through	Holyhead,
Dublin,	,,	Liverpool,
Dunmore, or	,,	Milford,
Waterford,	,,	Bristol,
Donaghadee,	,,	Portpatrick.

LINES SUGGESTED.

To Dublin,	through	Orme's Bay,
Dublin,	,,	Porth-Dynllaen,
Wicklow,	,,	Porth-Dynllaen,
Kingstown,	,,	Fishguard,
Wicklow,	,,	Fishguard,
Wexford,	,,	Fishguard,
Ardglass,	,,	Liverpool.

Holyhead Line.—The principal communication, at present, between London and Ireland is by Holyhead. The Mail is conveyed in $36\frac{1}{4}$ hours from Dublin to London, and usually in $34\frac{1}{4}$ from London to Dublin.

The difference arises from the necessity of making allowance in the departure of the coach from Holyhead, for occasional long passages across the Irish Channel, in order to secure a regular arrival in London.

By the arrival of the whole of the Irish, as well as the London Mails in Dublin early in the morning, and their not being generally despatched till the evening, a loss of twelve hours is occasioned for all such letters to and from the interior of Ireland.

The only improvement to be anticipated, for some time, on this line, is that which will be occasioned by the opening of the London and Birmingham Railway, a saving in time, of perhaps eight hours will then be effected in the conveyance of the Mail to Wolverhampton; in consequence of which it would reach Dublin at half-past ten o'clock at night. An issue after that hour could be of no advantage to the ordinary correspondence of Dublin or the interior, but greater regularity would be insured by allowing so many hours to spare for long passages; and, in very urgent cases, an express to any town in the interior of Ireland might gain nearly 24 hours on the present Mail time.

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* This Report, with its illustrating Plan, is annexed, Appendix A, No. 3, p. 35.

When, however, the Railway shall be open all the way to Liverpool, the Mail will be conveyed to that port so quickly, that Holyhead will probably be abandoned as a station; but as the shortest sea voyage to Dublin is to be made from Holyhead, it is of importance to consider the means of carrying a Railway hereafter to the latter port.

Exploring surveys have fixed the general direction which such a Railway must take, but the difficulties are represented to be very great.*

Were such a Railway, however, carried into execution, and the port improved so as to admit a better class of vessels, the Mail between London and Dublin might probably be delivered within 17 hours 52 or 53 minutes, supposing no delay to be occasioned in passing the Menai Bridge. The time is made up thus,—half an hour from the Post Office in London to the Railway station, and for starting; ten hours five minutes for the Railway conveyance, 272 miles, at 27 miles per hour; and half an hour for embarking and sailing; ten miles per hour for voyage, and half an hour for landing at Kingstown, and reaching the Dublin Post Office.

A continued rate of 27 miles per hour, including stoppages, seems to be now considered an extraordinary speed; but, without speculating upon the very high velocities occasionally anticipated, though never yet carried into effect for purposes of constant ordinary communication, it may be estimated, even in the present state of Railway practice, that 30 miles per hour may be obtained should great and paramount interests demand the application of the force and exertion requisite for that purpose.

It is presumed to be entirely a question of expense; and the difference of expense must be great indeed to counterbalance the advantages which would arise from the gain of a single hour in the correspondence between London and all parts of Ireland.

It is required by the Admiralty, in its conditions for a contract to convey the Mails from port to port, that the vessels engaged shall be capable of steaming 11 miles per hour, in smooth water; and, by comparing this rule with the experience of the Liverpool packets, 10 miles per hour may reasonably be assumed as a fair average rate in crossing this Channel.

Liverpool Line.—The communication from London to Dublin *viâ* Liverpool, is performed by coach in about the same time as by Holyhead.

When the entire line of Railway between London and Liverpool (now in a very forward state) shall be opened, the Mail might reach the latter place, by that conveyance, within 8½ hours from the time of leaving the Post Office in London; thus saving upwards of 12 hours.

With the present packets and arrangements, it would, consequently, arrive in Dublin at about a quarter past six, P.M., that is, three quarters of an hour before the departure of the Mails to the interior. The entire conveyance from London would thus occupy 22¼ hours; being about four hours less than will be required by the route to Holyhead, when the London and Birmingham Railway shall be completed.

This is an approach to a considerable advantage; for though the Dublin correspondence would be only benefitted by the many additional hours to spare for occasional long passages, the letters might sometimes, though rarely, be ready for the despatch of the country Mails, and consequently, at those times would be accelerated 24 hours.

The time, however, would be so close that the failures would be very frequent, and therefore a further gain of two or three hours in the arrival of the Mail in Dublin, would be of much advantage, if it could possibly be obtained.

If the Mail service, on the London and Liverpool Railway, can be pushed to 30 miles per hour, a gain of three quarters of an hour will be effected; and another quarter may perhaps be saved, by conveying the bags of letters at once on board, without communicating with the Post Office at Liverpool; this would bring it to Dublin by half-past five, P.M.; then, by deferring the departure of the coaches from Dublin to eight, or still better, to nine, P.M., the London Mails might be almost uniformly despatched at the same hour; and this, it is to be observed, has reference to what may be attempted in the course of the ensuing year, by merely taking advantage of circumstances as they will then exist.*

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* Vide Mr. Vignoles's Report on the lines through Wales, Appendix A., No. 3. The distance to be traversed, from London, would be 272 miles.

By these means, London letters might be received at a distance of 100 or 110 miles, in the interior of Ireland, within 36 or 37 hours; and nearly the whole day be allowed for preparing answers, which, by corresponding arrangements in the country, might reach London in 38 or 39 hours. Towns at that distance from the Metropolis would thus be placed in very nearly as good a position, in point of practical accommodation, with respect to the hours of arrival and departure of the London Mail, as Dublin itself.

The first and most obvious advantage to the interior of Ireland, from such an arrangement, would be a reduction from five days to three in the time which intervenes between the despatch of a letter to London, and the receipt of an answer.

It must be borne in mind, however, that this calculation is founded upon the presumed maintenance of the highest velocity throughout the whole route; namely, 30 miles per hour on the Railway, and 10 miles per hour across the Channel, and yet it allows but three hours, at the utmost, to spare; so that many failures might still be anticipated.

The Liverpool passage, also, will be always subject to peculiar irregularity, in consequence, 1st, of the force of strong tides operating sometimes favourably, sometimes the reverse; 2nd, of the prevailing wind being directly contrary from Liverpool to Dublin; 3rd, of want of water to enable the larger vessels to pass the bar of the Mersey, for certain days of the low water spring tides; 4th, of the necessity of frequently taking what is called the new channel, which is longer than the other; and, 5th, because the hours of departure, either under the present or the intended new arrangement, are the most unfavourable that could be selected for the strongest and lowest tides.

Orme's Bay.—It has been suggested, that a greatly improved communication could be effected, by constructing a harbour at Orme's Bay, between Liverpool and Holyhead, and that a Railway, 230 miles from London, could be advantageously carried thither.

The passage from Orme's Bay to Kingstown would be 96 miles.

At the same rates as before mentioned, namely, 27 miles per hour for Railway, and 10 miles per hour for voyage, and the same allowance for delay in passing to and from the Railway stations, embarking, &c., this communication would be effected in 19 hours 38 minutes, being nearly three hours less than by Liverpool; it would be attended with less irregularity, in consequence of the shorter voyage; be free from the inconvenience occasioned by getting in or out of the harbour, and not liable, to the same extent, to the obstruction of unfavorable tides; but it would be equally subject to the bad effect of the prevailing winds being directly contrary in the passage to Ireland.

The arrival at Dublin would then be at about half-past three, P.M., and the issue of letters perhaps at half-past four.

The Mail for London would leave at half-past nine, A.M., by which answers to letters received by the previous night's post might be forwarded, if delivered at the Post Office before half-past eight, A.M., whereby a saving of 24 hours on the present system would be effected; and to a letter sent from Dublin by this Mail, an answer could be received from London on the evening of the second day.

But the harbour is yet to be made, as well as a considerable distance of Railway.

Porth-Dynllaen.—Another project is the construction of a new harbour at Porth-Dynllaen, on the coast of Carnarvon, to which a Railway can be carried from the Birmingham line, making a distance of 260 miles from London.

The voyage would be 70 miles. This communication would, consequently, take 18 hours 8 minutes, being an advantage of about one and a half hour over the route by Orme's Bay; the voyage also would be shorter and more favorable in direction, as regards the prevailing wind, than any of the preceding; but the communication would be about a quarter of an hour longer than by a perfect line to Holyhead.

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* There are two projects in contemplation; one of a Railway from the Grand Junction at Crewe, to Birkenhead by Chester: and the other to cut off the angle by Warrington and Newtown, either of which would save some miles, and thus create another saving in time; it has also been suggested, that the Irish Mail might, without inconvenience, quit London at seven, instead of at eight, P.M.

For the accomplishment of this line, however, as well as that by Orme's Bay, it would be necessary to construct a new harbour, and a great extent of Railway.

For the particulars of the different modes of reaching the several ports in North Wales, by Railway, from London, see Mr. Vignoles's Report in the Appendix.

By reaching Dublin from London in about 18 hours, as calculated either from Holyhead or Porth-Dynllaen, and allowing one hour for sorting, the letters would be issued about three, P.M., and the departure being about 11, A.M., time would be afforded for returning answers by the next morning's post, by which 24 hours would be saved on the present periods of return; and again, letters put into the post by ten, A.M., might be answered, from London, by three, P.M., of the third day, instead of the fifth, as at present.

It would still require the three intervening days before an exchange of letters could take place between London and the interior of Ireland. But when Railways shall be established in Ireland, from Dublin, the Mail from London might be delivered in most parts of the interior, to which Railways shall extend, on the evening of the day of their arrival in Dublin, and the returns being equally quick, it will be possible, on occasions of emergency, to save another whole day in the correspondence of the interior; that is, to answer a communication from London with only two intermediate days, instead of five, as at present.

Independently of the Mails, very great advantages will be given to passengers, in the saving of time, particularly when they are going to the interior.

Any of the above-mentioned communications that can be effected with such a degree of regularity as to insure the arrival of English letters and travellers in Dublin before the departure of the country Mails, will make Dublin the best, as being, in point of time, the surest route, by which the south of Ireland can be reached from London; and this, notwithstanding the improvements which may be effected in the Bristol, or Milford and Waterford line. The advantage will, of course, be yet greater when there shall be Railways from Dublin.

With regard to the north of Ireland, a quicker route might be effected by Liverpool and Ardglass, if the port of Ardglass were considered fit for a packet station, and the advantage worth its establishment; but the voyage would be longer than between Holyhead, Porth-Dynllaen, or Orme's Bay, and Kingstown, and the arrival at Belfast, at about eight, P.M., would not give any great practical benefit. A direct navigation from Liverpool to Belfast would not offer any saving in time; but should a Railway communication be continued from Lancaster to Glasgow, which appears not to be improbable, the Mail might be forwarded, by that route, to Portpatrick, for the north of Ireland, so as to reach Belfast, perhaps, in about 19 or 20 hours.

Wicklow.—Another plan has been proposed as an improvement on the Porth-Dynllaen and Kingstown line, which is, the construction of a new harbour at Wicklow, with a view to gain time, by shortening the voyage across the channel; Wicklow being nearly opposite Porth-Dynllaen, and the distance between them only 60 statute miles.

It is stated in favour of this passage, that it would be clear of the Kish Bank, and that there would not be more than ten miles of the passage in which either the light on Wicklow Head, or that of the opposite coast, would not be visible.

In comparing Wicklow with Kingstown, as the Irish packet station, on this line, every thing may be considered equal from the time of leaving London to that of departure from Porth-Dynllaen, and the packets in either case the same. By Wicklow there will then be a voyage of 60 miles or 6 hours; and 30 miles by Railway, one hour seven minutes; by Kingstown, a voyage of 70 miles, or seven hours; Railway, six miles, 13½ minutes. The time for landing, for conveying the Mail from the Railway to the Post Office, &c., being the same in either case. By this calculation a difference appears of six and a half minutes in favour of Wicklow, which might also be supposed to have the additional advantage of being subject to less irregularity, by reason of the shorter voyage; but Kingstown, as before remarked, is in a more favorable direction with regard to the prevailing wind, and the last ten miles, which constitute the difference in distance, would, during adverse winds (when alone the shorter voyage would be of very great consequence), be much under shelter of the land.

As there is a good floating light on the Kish, and well out to sea, the advantages, as respects that bank or the nearness of the lights, are but small. It is only in cases of fog that there could be any inconvenience, and then it is difficult to make any shore. It may be remarked, also, that the passage would be always a day passage. This latter advantage is common to all these improved projects.

The Wicklow plan would require the construction of an entirely new harbour at that place, for which the facilities are not great; and it would also require an extension of the Railway for about 24 miles from Kingstown.

But this is no obstacle to the project for establishing a harbour at Porth-Dynllaen, and a Railway in connexion with it, should such be deemed advisable, on other grounds; for Kingstown would be available in the first instance, and the harbour at Wicklow might be added subsequently, if thought desirable.

Milford and Dunmore.—The distance from London to Milford is about 265 miles, and is performed by the mail in 33 hours:

The voyage across to Dunmore, 81 miles, takes 12 hours during one-third of the year:

These, together with 1½ hour consumed between Dunmore and Waterford, the time of landing being included in the latter space, will make 46½ hours.

Now, supposing a Railway to be made from London to Gloucester, 110 miles (4½ hours from the Post Office in London), and the road thence to Milford improved, and shortened to 150 miles, which might be traversed in 16½ hours; and that a better description of packets were employed, so as to make an average voyage of 10 hours, which is as much as seems to be looked for; this calculation, allowing 1½ hour, as before, between Dunmore and Waterford, will give 32½ hours from London, the passage being, moreover, liable to peculiar irregularities from the exposed sea to be crossed.

It has been shown, however, that as soon as the London and Liverpool Railway shall be open, arrangements may be made for forwarding the London letters ordinarily by the night mails from Dublin, and they might consequently reach Waterford, by that line, in little more than the same time; or, at least, sufficiently early in the morning for every object of practical utility.

Should any of the projects be executed as proposed, for Holyhead, Porth-Dynllaen, or Orme's Bay, the communication will be rendered more certain and expeditious; and, should there be a Railway from Dublin, either to Waterford or for any part of the distance, the letters will be still more accelerated.

It may be observed here, that the greatest advantage to be derived from the acceleration of the London Mail, according to the plans which have as yet been suggested, would be received by those places where the communications could be accomplished in less than 22 hours; that is, at any hour before six, P.M., of the day next after the despatch from London. In the next degree of advantage would be those places which might be reached within 34 hours, or down to six, A.M., of the second morning from London. But the arrival of the Mail, at any intermediate time between those hours, would not be an object of much practical importance; for letters arriving later than six in the evening, would remain in the Post Office during the night; and, therefore, it would signify nothing, as to public accommodation, whether they should have been deposited there at or before midnight, or a few minutes only previous to the opening of the Office, for their delivery, in the morning. But in Ireland, owing to the unavoidable irregularity and uncertainty of the sea, this becomes a matter of no slight importance; because the longer the interval between the regular hours for the arrival of the steam packet at its station on the Irish coast, and that of the delivery of its contents, provided that no opportunity of reply be lost in consequence of delay, the greater security will be afforded against disappointments, occasioned by adverse weather, or the occurrence of other casualties during the voyage.

Bristol and Dunmore, or Waterford.—It has been proposed to convey the mail from Portishead, 10 miles below Bristol, from whence the vessels could depart at all times of tide to Dunmore or Waterford.

The journey from London would be about 120 miles, and when the Bristol Railway is completed, it may perhaps be performed in 5½ hours including the transfer from the Post Office to the Railway, and the coaching from Bristol to Portishead; but the voyage to Dunmore would be nearly 200 miles; to perform this, an average of, at least, 24 hours, must be calculated upon, and that subject to peculiar irregularity from the exposed sea, and, for at least 9 months in the year, to the unfavorable south-west wind, and to a very strong tide, up or down the Severn, for 60 miles.

The time to Waterford (including 1½ hour from Dunmore) would be then 31½ hours, and therefore no essential advantage would be gained in point of time, while there would be a great and frequent liability to delay; and irregularity in the arrival of Mails is always to be avoided.

Fishguard.—It has been proposed, also, to establish a line of communication with Ireland, by way of Fishguard, a bay on the coast of Carmarthen, in South Wales, which is said to be well adapted for the construction of a harbour for packets, as well as for a port of general refuge.

The Railway from London would be *viâ* Gloucester, extending 110 miles to that place (by the line at present sanctioned by Parliament, but which, it is said, might be reduced to about 103 by taking another direction *viâ* Steventon), and thence about 150 miles, to Fishguard, the whole distance being about the same, or rather less than to Porth-Dynllaen, viz., 260 miles. The voyage to Kingstown, however, from Porth-Dynllaen would be shorter, by more than 30 miles, than from Fishguard, and that from Holyhead, shorter by 37 miles. Nor would there be any useful object gained by forwarding the Mails from Fishguard to Waterford, the length of voyage and the nature of the sea to be passed being objectionable. The harbour of Fishguard is still to be constructed, as well as a great extent of Railway. Parliamentary sanction has been obtained for a line as far as Gloucester; from thence to Fishguard, supposed about 150 miles, remains to be undertaken.

With regard to Wexford, which lies opposite to Fishguard, there would still be a voyage of 69 miles, to a port not adapted to the packet service, and thence a long distance, and difficult country to be traversed in order to get into the interior.

Hence, it would appear, that by taking advantage of any of the probable modes by which the country mails may be despatched from Dublin in 24 hours after leaving London, a saving may be effected by the reduction of the whole of the packet establishments, except one, as well as of the day Mails from Dublin to Cork and Belfast. It will only be necessary to provide for a direct communication between the west of England and the south of Ireland.

By the Porth-Dynllaen, Orme's Bay, or Holyhead projects, the Liverpool Mail for Ireland would also eventually be brought down to either of those, as a concentrated packet station. Upon the whole, it will appear, that in order to effect the most rapid communication between London and Ireland, a selection is to be made between a line of Railway to Holyhead or to Porth-Dynllaen.

In point of time, the difference, between those two lines, according to the above calculations, appears so small that it will require to be further considered.

In making comparisons of this kind, the actual distance is commonly assumed as the measure of the time, a form of calculation sufficiently accurate for ordinary purposes, and where other circumstances strongly concur in favor of a particular conclusion; but in a nicely balanced case, time being the only or principal consideration, it should be well understood that a mere comparison of distances may often prove a most fallacious mode of estimating the time necessary for travelling over a given space. There

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may exist, on the one hand, peculiar and unavoidable causes of delay, such, for example, as will be presented in the passage of the Menai Strait, on the Holyhead line; while inferior gradients (should they prove so) may retard the progress equally on the line to Porth-Dynllaen.

It is sufficient at present to advert to the extent of capability that exists for a very improved communication; whenever it shall be considered expedient to carry either project into execution, more minute investigation will be required to fix their comparative merits, with reference to facility of execution, to the benefit of the country, (as means of internal communication through North Wales,) and to the expense, as well as to the ultimate results which are aimed at.

Although the passenger traffic must be very considerable, comprising, as the line will, that for the whole of Ireland, or nearly so; and increased, in a great degree, by the more rapid and cheaper medium of intercourse; still, as a considerable portion of the line will produce very little accession of business in Wales itself, it is not to be expected that such a project can be carried into execution without aid from the public, and probably it will be best to effect it by direct government agency.

RATES at which it is calculated that the MAILS may be conveyed from the POST OFFICE in LONDON to that in DUBLIN, by the construction of RAILWAYS that have been projected, or may perhaps be executed.

English Port.	Distance from London.	Time by Railway		Irish Port.	Length of Voyage.	Time on Voyage, including 30 minutes for Embarking and Sailing.		Time from Irish Port to Dublin, including landing.		Whole Time.		Hour of Arrival in Dublin.		Hour of Departure of Mail from Dublin for London	
	Miles.	H.	M.		Stat. Mil.	Hours.	Mins.	Hours.	Mins.	Hours.	Mins.	H.	M.	H.	M.
Holyhead	272	10	35	Kingstown	63	6	48	0	30	17	53	1	53 P.M.	11	7 A.M.
Liverpool	210	8	17	Kingstown	130	13	30	0	30	22	17	6	17 ,,	6	43 ,,
Orme's Bay	230	9	1	Kingstown	96	10	6	0	30	19	37	3	37 ,,	9	28 ,,
Prt-Dynllaen	260	10	8	Kingstown	70	7	30	0	30	18	8	2	8 ,,	10	52 ,,
Prt-Dynllaen	260	10	8	Wicklow	60	6	30	1	23½	18	1½	2	1½ ,,	10	58½ ,,
Fishguard	260	10	8	Wicklow	79	8	24	1	23½	19	55½	3	55½ ,,	9	41½

One half hour is allowed from the Post Office in London to starting on Railway; 27 miles per hour for the Railway; 10 miles per hour for Steam Packet Voyage; 30 minutes from Railway to embark and sail; 2 hours additional for return to London to allow for occasional long passages by sea. Hour of leaving London, 8 P.M.; hour of arrival, 7 A.M.

We have an opportunity of adding an interesting statement, Appendix A, No. 13, obtained at a very late period, from William Cubitt, Esq., C. E., on the various modes by which a communication may be effected between London and Dublin.

It is satisfactory to find that our opinions, in every essential, are in a great degree confirmed by so good an authority.

The whole matter being one of comparative merits, the difference of principles on which the rates of travelling are calculated is of minor importance, the same being carried through each paper.

II. As to the Present Condition of the Population of Ireland.

1. CIRCUMSTANCES PECULIAR TO THAT CONDITION.

The present social aspect and condition of Ireland, is an anomaly in itself. Whilst the country is making a visible and steady progress in improvement, and signs of increasing wealth present themselves on all sides, the labouring population, constituting a large majority of the community, derive no proportionate benefit from the growing prosperity around them. In many places their condition is even worse than it has been. This apparent incongruity is, however, easily understood and explained, by a reference to the peculiar state of property, and to the complex relations which subsist between the proprietors and the several parties deriving interests under them, from the immediate tenant down to the actual occupier of the soil.

The division of the land into small farms, and their sub-division into portions, continually decreasing in extent, with each succeeding generation of claimants, until, on some estates, literally every rood of ground maintained, or rather was charged with the maintenance of "its man," was the immediate cause of the rapid increase of the population, which, within a period of fifty years, has risen from four millions to upwards of eight.

The defective state of the law, which, for a long time afforded the landlord no adequate security against the partition of his estates, and the long term of years or lives for which it was customary to grant leases, without any valid limitations being set upon the power of the tenant to underlet, contributed without doubt to this result. But there were other causes in which the proprietors had a more direct and personal participation, and which justly impose upon them a full share of responsibility for the consequences. Not only did they not discourage the multiplication of small tenures, (which they might have done effectually by their influence, even in cases where, by former demises, the management of their estates had been placed in the power, and depended upon the will of others,) but they were themselves active promoters of that system, and that from two obvious and intelligible motives,—a desire to swell the amount of their rent-rolls, which were at first considerably increased by the operation of this principle, and a wish to possess themselves of political influence and power at the elections. The local operation of the latter cause is manifest, and admits of distinct proofs in almost every populous district in Ireland; and its general effect may be inferred, from the remarkable and accelerated increase of the population, which took place from the year 1793, the date of the Act for conferring the Elective Franchise on that class of voters known as the Forty Shilling Freeholders. In 1791 the numbers were 4,206,612; in 1821 they were found to have increased to 6,801,827; in 1831 to 7,767,401; and they now amount to more than eight and a half millions. It is due to the proprietors and intermediate landlords who took no measures to repress this astonishing increase, while it might have been beneficially checked without inconvenience or injury to any individual, to admit, that few persons, during its early stages, foresaw its rapid extension, or suspected the evils it would bring in its train. But this consideration, while it exonerates them from the imputation of culpable design or indifference, does not exempt them from the necessary consequences of their improvidence, or from the just obligations and duties inseparable from the possession of property.

The misery and destitution which prevail so extensively, together with all the demoralization incident to the peculiar condition of the Irish peasantry, may be traced to this source. The country, particularly in the west and south-western counties, is overspread with small but exceedingly crowded communities, sometimes located in villages, but more frequently in isolated tenements, exclusively composed of the poorest class of labourers, who, removed from the presence and social or moral influence of a better and more enlightened class, are left, generally, to the coercive power of the law alone to hold them within the bounds of peace and order. No system of constant or remunerative industry is established amongst them. The cultivation of their patches of land and the labour of providing fuel are their sole employment, which, occupying but a comparatively small portion of their time, leaves them exposed to all the temptations of an idle, reckless, and needy existence.

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In such a community there is no demand for hired labourers. Every occupier, with such assistance as his own family can furnish, manages to raise the scanty supply of food which he may need for their support, and as much grain, or other produce, as may be required to pay his rent; but beyond this, there is no solicitude about cultivating the land, nor the least taste for improving or making it more valuable. At the periods of active labor, when additional hands are absolutely necessary, every expedient is resorted to in order to avoid the employment of a single paid laborer. Children of tender years are then forced to do the work of men in the fields, to a degree far beyond their strength, and all the females who are capable of rendering assistance, are tasked in many ways utterly unsuited to their sex, and incompatible with the slightest attention to their proper cares and duties. At all times, indeed, of the year, whether the case be urgent or not, the share of labor, out of doors, imposed upon women and young girls, who might, in every respect, be so much better occupied, is as injurious to the moral condition, as it must be to the personal and domestic comfort of the peasantry.

There is a class of landholders superior to these, holding from eight to twelve or fifteen acres, who are equally slovenly and careless in the management of their land; but necessarily obliged, on account of its greater extent, to procure assistance out of their own families. Sometimes, but rarely, these persons hire daily laborers among the neighbouring poor; and in such cases they are usually guided in their choice, not by the character or capability of the man they employ, but by the lowest rate of wages at which they can possibly obtain his service. More commonly, however, they engage, as farm servants, young men between sixteen and twenty-five years of age, who reside in the family of their employer, and hire themselves out at remarkably low wages, seldom exceeding £1 per quarter, and, in numerous instances, scarcely more than half that sum.

The litigation which occupies a great portion of the time of the several Courts of Petty Sessions, arises out of the disputes of this class of servants with their employers; the former being usually impatient to break off their engagements at the busy and more profitable season of the year, and the latter anxious, of course, to reap the full benefit of the contract. Another common subject of angry contention, before the same tribunals, is furnished by ill defined boundaries, neglected fences, and consequent trespass between the neighbouring tenants of the small divisions of land above described. More time and money are commonly wasted in such contests than would suffice to repair all the damage which forms the ground of quarrel; and animosities are engendered which often lead to feuds of a lasting duration, and the most deadly consequences.

It is plain, that under such a distribution of property, no rational hope can be entertained of the general introduction of an improved system of husbandry, or the employment of the labouring poor, to the extent and in the manner which would be beneficial to them, and conducive to the prosperity and good order of the community.

It is, therefore, much to be wished that such a system should no longer continue. For the preservation of property—for the interests of the public peace—for the progress of civilization and improvement—and for the permanent good of the rural population, it is desirable that a speedy alteration should take place. The evil cannot remain stationary; it must either be met with effective opposition, or it will, by its own accumulative force, proceed to the last point at which the process of subdivision is practicable; and what may be the consequences of suffering it to go so far, it is painful to contemplate. How rapidly it is in some places approaching to that point, may be gathered from the Population Returns of the Board of Trade, which represent an increase to have taken place between the years 1821 and 1831, amounting, in certain western counties, to one in five, and, in others, nearly to one in four, of the whole number of inhabitants:—viz.,

In Donegal,	- increase - - -	20 per cent.
Mayo,	- ,, - - -	24 ,,
Galway,	- ,, - - -	23 ,,
Clare,	- ,, - - -	24 ,,

Among the effects of this rapid increase of population, without a corresponding increase of remunerative employment, the most alarming, though perhaps the most obviously to be expected, is a deterioration of the food of the peasantry. It could scarcely be thought, indeed, that their customary diet would admit of any reduction, save in quantity alone; yet it has been reduced as in quality also, in such a way as sensibly to diminish their comfort, if not to impair their health. Bread was never an article of common use amongst the laboring poor; but it is now less known by them than it was at the time when a sum exceeding £50,000 per annum was paid in "Bounties," to induce the landholders to grow a sufficiency of grain for the supply of the city of Dublin.* Milk is become almost a luxury to many of them; and the quality of their potato diet is generally much inferior to what it was at the commencement of the present century. A species of potato called the "Lumper," has been brought into general cultivation, on account of its great productiveness, and the facility with which it can be raised from an inferior soil and with a comparatively small portion of manure. This root, at its first introduction, was scarcely considered food good enough for swine; it neither possesses the farinaceous qualities of the better varieties of the plant, nor is it as palatable as any other, being wet and tasteless, and, in point of substantial nutriment, little better, as an article of human food, than a Swedish turnip. In many counties of Leinster, and throughout the provinces of Munster and Connaught, the Lumper now constitutes the principal food of the labouring peasantry; a fact which is the more striking, when we consider the great increase of produce, together with its manifest improvement in quality, which is annually raised in Ireland, for exportation and for consumption by the superior classes.

For some years the proprietors of land have endeavoured to counteract the evils arising from the increase of a pauper and unemployed population, and to prevent its extension. Their eyes have long been opened to the mischief partly created, and, in a great measure, countenanced by themselves, and they are quite willing to retrace their steps, and reduce their estates, if possible, to a condition more favorable to a judicious mode of cultivation, and to the regular and profitable occupation of the poor. The habit of letting their grounds in small allotments, has altogether ceased in the agricultural districts, though it still prevails in parts of the manufacturing counties of Armagh and Down, where the skill of the artizan is rendered in some degree subsidiary to the toil of the laborer. Generally, however, as often as opportunities occur, they are gladly embraced, to enlarge the divisions of land to farms of dimensions better adapted to the development of agricultural science, and the beneficial employment of capital and labour. In some cases these changes have been conducted with judicious humanity; in many, it is to be feared, without much regard either to humanity or justice; but where they can be effected without injury to individual happiness, or equitable rights, without doubt they must, in all cases, tend to the ultimate advantage of society, as a means of checking a great and growing evil, of increasing the wealth of the country, and, consequently, laying a firm and sure foundation of prosperity for the Irish people.

Already considerable progress has been made towards the establishment of a better system of agriculture, and the altered and much improved appearance of the country in many places, is owing to the success which has attended those endeavours. But, although the land has thus been rendered more valuable, and its produce more abundant, the condition of the labouring poor has not advanced, even in those improved localities.

The fair inference to be drawn from this fact, is, that the labourer is not allowed a just proportion of the product of his own toil and industry; but the cause of that inadequate remuneration will be found in the increased number of persons forced into the market-place in quest of daily employment, in consequence of their being deprived of the resource of the potato-garden and the mud hovel, in order to make room for the improvement of the land. The number of hands absolutely unemployed being thus increased, the price of labor will, of course, be kept down. Nor should it be omitted or disguised, that in proportion as these improvements shall become more general, the multitude of applicants for employment, will still farther exceed the demand for their labor; and, consequently their condition, if left entirely dependent upon the aid of the mere agriculturist, will be still more depressed, while the country is advancing in wealth and abundance.

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* By a table published in Mr. Newenham's *View of Ireland*, it appears that in a period of 37 years, up to 1798, a sum of £1,917,770, was paid in Bounties for grain and flour, brought by land carriage, canal, and coastways, to Dublin. The amount lavished in Bounties, during the last century, would have sufficed to place Ireland on a par with any part of the United Kingdom in the advantages of internal communication.

Such appear to be the inseparable concomitants of that transition which a considerable portion of the Irish peasantry are actually undergoing at present, and through which it is necessary, for the general good, that they shall all pass—a transition from the state of pauper tenants, to that of independent labourers, maintained, as the same class are in England, by their daily labour. This change cannot much longer be delayed with safety. It is not possible to avoid it by any other alternative than that of permitting a state of society, pregnant with all the elements of disorder and confusion, to go on unchecked, until it forces the whole population down to the lowest depths of misery and degradation.

The proprietors of estates claim public support, in their endeavours to bring the country to a sound and secure condition, by opposing and counteracting the further progress of so ruinous a system; and if they would proceed in all cases with discretion, and a just consideration of those whose interests are as nearly concerned as their own, they are entitled to it. Of course we do not palliate the injustice and cruelty of turning families adrift, helpless and unprotected upon the world. There is a compact, implied at least, between the landlord and the peasantry who have been brought up on his estate, by which the latter have as good a right to protection, as the lord of the soil has to make arbitrary dispositions for the future management of his property. Nor do we think that it makes much difference as to the force of this obligation, whether the injurious sub-division of lands was made by the direct sanction and for the immediate benefit of the tenant in fee, or by others to whom the power of a landlord over the property had been delegated by lease. It is not denied, that those sub-divisions were lawful at the time they were made. They were a part of the system then recognised and in operation for the management of property; for their effects, therefore, upon the general welfare and security, the property itself is justly to be held accountable. Nor is this responsibility to be shuffled aside, or laid at the door of persons, who, having ceased to possess an interest in the lands, are no longer in a state to repair the error that has been committed; but the country will look to those who now hold the property, having received it charged with all its moral as well as its legal engagements.

Still, however, as the landholders and owners of estates are really unable to sustain the whole of this liability, and to proceed, at the same time, with that work of improvement which is so essential for the interests of all classes of the community, and, eventually, of none more than of the laboring poor, it is much to be desired, as an object of public importance, that means may be speedily taken to distribute a part of the burden through other channels. If there were no other public ground for doing so, it would be motive sufficient, that the suffering and privation which seem inevitable, during the transition of so vast a number of people from one state of living to another, would be thereby alleviated, and its period considerably abridged.

Among the measures proposed for this purpose, that which appears to have obtained the most favorable share of the popular attention, is the reclaiming of waste lands, such as bogs and mountains, of which there are millions of acres in Ireland, very capable of improvement. No doubt, a great deal of most useful improvement might be effected in this way; and, what is more to our present purpose, a wide door might be thereby opened for the profitable employment of numbers of the peasantry; but much will depend on the regulating principle, and the object of such undertakings—whether the people shall be set to work as daily labourers, to divide and cultivate large tracts for the agricultural capitalist, or as colonists, to reclaim and make rude settlements for themselves. If the latter be contemplated, it would, in effect, but spread and magnify the evil which it is proposed to remedy, only removing its pressure partially, and for a short period. As a measure of immediate relief, the change would be scarcely attended with any increase of comfort to the peasantry, while their position would be rendered far more hopeless that it is even now, and the ultimate consequences to society, in its moral as well as in its political results, would be most disastrous. An extensive reclamation of the waste lands, however, by the application of capital and intelligence, and upon a well-ordered system, would add most materially to the resources of the country, and, besides affording the means of present employment to great numbers, assist in providing permanently and beneficially for them, as paid laborers, on the land reclaimed through their exertions.

Emigration is another project to which there can be no objection, except that of its insufficiency as a remedy for so wide spread and multitudinous an evil. It is impossible that emigration could be effected on so large a scale, were the people themselves ever so anxious to embrace it, as wholly to remove the pressure of distress arising from the excess of the population over the means now available for their support. It can only be resorted to as a secondary relief, effectual as far as it goes, and therefore deserving of attention and encouragement; but it must always leave behind it so many destitute and unemployed, that the cares of the Legislature or the burdens of the country can experience no very sensible alleviation from its aid.

The measure now before Parliament, for the relief of the Irish poor, is also relied on as a means of enabling the peasantry to buffet and overcome the difficulties of their present and impending position. It is not for us to canvass the merits or probable effects of that Bill. But we may observe, that an effective Poor Law must greatly assist the object we are considering; and it is, therefore, most desirable that its provisions should be carried into effect promptly and fully. It should be recollected, however, that the landed interest will be taxed heavily for the support of the poor under that Act; and it would, therefore, be a most auspicious introduction of so great a change in the social state of the country, if the pressure of that measure were lightened by the commencement of some works of great magnitude, which should last for a considerable time, and afford employment to large numbers of the people in various parts of Ireland. And if such undertakings were of a nature evidently calculated to open new avenues to laborious industry, and thus hold out a reasonable prospect of constant occupation, even after the period of their completion, the anxiety which, both on grounds of humanity and of policy, must attend the adoption of so great a change, would be allayed, and the most formidable of its immediate inconveniences be effectually obviated.

The works necessary for completing such a system of Railways as our Report contemplates, would serve both these purposes, by affording present employment to vast numbers of the people, and by throwing open resources and means of profitable occupation, which are now inaccessible and almost unknown. The immediate effect would be, to afford extensive relief to the most indigent portion of the population, and that in a manner the most acceptable to their feelings, and the most conducive to their moral improvement. "In all the views of Ireland placed before the "empire," as Mr. Stanley in a letter to Mr. Nicholls well observes, "there "is a remarkable concurrence in attributing the poverty which exists "to the want of continuous employment for the population." To that want of continuous employment, and of adequate remuneration when employed, may be traced the cause, not only of the poverty of the Irish people, but, in a great measure, also of that heedless improvidence, and of those habits of lassitude and indolence, which it may possibly require years of a better system to eradicate wholly from their character.

The effect of these depressing circumstances, aggravated, of course, in a very high degree, by the backward state of agricultural knowledge and improvement, is strikingly illustrated in the deficiency of the produce of work performed by Irish labourers to that of the same class in England.

PART III. The Irish Poor Law Commissioners state, that the average produce of the soil in Ireland is not much above one-half the average produce in England, whilst the number of laborers employed in agriculture is, in proportion to the quantity of land under cultivation, more than double, namely, as five to two; thus, ten labourers in Ireland raise only the same quantity of produce that two labourers raise in England, and this produce, too, is generally of an inferior quality. So striking a disproportion, though certainly admitting of very considerable qualification, with reference to the different nature and degree of aid and facilities afforded to the labourers in the two countries, still shows a decided advantage in favor of the English workman, and fully confirms an observation which we have elsewhere made, as to the dearness of ill-requited labour.

But the spirit of the Irish peasant is by no means so sunk by the adverse circumstances of his lot, as to be insensible to the stimulus which a due measure of encouragement to laborious industry supplies. Where employment is to be obtained without difficulty, and at a fair rate of compensation, his character and habits rise in an incredibly short space of time with the alteration of his circumstances. In a state of destitution no race of people are more patient and resigned. Their uncomplaining endurance seems almost to border on despondency. They make no effort to help themselves, probably because they despair of being able to do so effectually; and it ought to be mentioned to their honor, that in such emergencies they have scarcely ever been known to extort by violence that relief which cannot be obtained from their own lawful exertions, or the benevolence of others. Their fortitude during the unparalleled sufferings of 1822 was regarded with the greatest admiration and respect; feelings which have not failed to be renewed by their conduct on every subsequent trial of a similar kind. Within the last two years, namely, in the summer of 1836, a populous district on the coast of Donegal was exposed to all the miseries of famine, rendered tenfold more agonising by the knowledge that there was food enough and to spare within a few miles; yet the poor people bore their hard lot with exemplary patience, and throughout the entire period, though numbers were actually without food, and reduced to eat sea-weed, there was no plundering of stores, no theft, nor secret pillage. Such forbearance, almost approaching to insensibility, might be deemed to belong to a character incapable of being roused to exertion in any circumstances; yet the same race, who endure the last extremes of want without a murmur, are no sooner placed in a condition of supporting themselves by independent industry, than they cast aside the torpor which distinguishes them in a depressed state, and become active, diligent, and laborious. The unsparing exertions and obliging disposition of the poor, half-starved harvestmen who periodically visit the west of England are well known, and will, we are sure, be cheerfully acknowledged by all who have had occasion to employ them.

The moral effect upon a people of a system of steady and remunerative employment is an object of public importance, not inferior to its influence upon their physical condition; for it is invariably found that where industry prevails, order and respect for the laws accompany it. Ireland forms no exception to this rule. The vice and the bane of its people is idleness. They have little to do; no useful or profitable occupation to devote their time and thoughts to; and hence those habits of intemperance, and that proneness to outrage and contention, which unhappily distinguish them. But those amongst them, who have been for any considerable time engaged in pursuits which afford encouragement to industry, rarely trouble themselves about angry local differences, or frequent the resorts of low profligacy and dissipation. The hand of the thrifty and diligent is not often raised in fierce and clamorous dispute, or seen amid scenes of sectarian strife and rancour. These are vices which proceed from idleness and the habits engendered by it; nor can there be any reasonable ground to doubt, that they would speedily disappear before the civilizing power of occupation and successful industry.

To afford the means of present employment to such a people, and, at the same time, lay the foundation of their future prosperity and improvement, is surely an object worthy of a wise and great nation, and will not be opposed from any narrow and short-sighted views of economy. The interests of these countries are so inseparably interwoven, that nothing which concerns one part of the United Kingdom can be alien from the rest. But it is the direct interest of Great Britain that Ireland should be raised, and that as speedily as possible, from its present condition. Mr. Stanley (see Appendix B, No. 14) shows, by a very moderate calculation, that if the Irish peasantry were placed, in point of comfort, on a par with those of Great Britain, the result to the public revenue would be an annual increase of six millions in the article of Excise. This consideration alone ought to silence any objections, on the ground of expense, against affording public aid such as may be required for these works; for it gives assurance of an enormous profit on the greatest contemplated outlay.

On prudential considerations alone, then, we should not hesitate to recommend an immediate and liberal attention to the claims of Ireland for assistance, which cannot be conferred in any shape more likely to prove beneficial than by encouraging public works of extensive and permanent utility. It is a waste of the public available resources to suffer so large a portion of the empire to lie fallow, or leave it to struggle, by slow advances and with defective means, towards its own improvement, when the judicious aid of the state might quickly make it a source of common strength and advantage.

The policy of rendering such assistance is unquestionable. It is acknowledged to be necessary towards a colony, and must be considered more so in the case of a part of the United Kingdom, comprehended within its domestic boundaries, where neither the land nor the population can continue to be useless without being hurtful at the same time, and nearly in the same degree. Looking, therefore, at the proposition as a mere account or estimate of profit and loss, the balance is clearly in favor of a prompt and liberal encouragement, on the part of the Legislature, to whatsoever tends manifestly to call into action the great powers and capabilities of this fine country. In every instance where such encouragement has been afforded, even in the construction of a common road, the returns to the state in improved revenue have hitherto more than repaid the public outlay; and, viewed in this light, public assistance, well directed and applied with judgment and economy, is in effect a beneficial expenditure of capital, similar in kind to that which a provident landlord makes for the improvement of his estate. The only measure of both should be the assurance of an adequate remuneration.

It were easy to show, from the actual state of Ireland, that the moral results which may reasonably be expected to flow from an improvement of its social condition, should suffice, even on the low ground of concomitant financial advantages, to fix the attention of the Legislature to this subject. We need but refer to the burdensome and costly establishments of Soldiery and Police, which are necessarily maintained for the preservation of peace and order, and which, in a really wholesome state of society, might be greatly reduced.

But there are other considerations equally importing the general welfare, and which it is more pleasing to dwell upon, as being more worthy of a great and enlightened nation—considerations of justice, of generosity—of a liberal concern for the improvement and civilization of our countrymen. In attending to such considerations, no nation was ever faithless or blind to its own best and dearest interests; and were there no commercial advantages for England in the projects which we submit for adoption, nor any promise of actual benefit to the public treasury, or of relief from the heavy contributions which the unsettled state of society in Ireland annually extracts from it, yet the certainty of rendering this country prosperous, and diffusing the blessings of peace and industry, with their attendant fruits of knowledge and moral culture amongst its people, ought, as we have no doubt it would, be considered an ample recompense.

2.—ON THE INFLUENCE OF RAILWAYS IN DEVELOPING THE RESOURCES OF A COUNTRY.

Experience testifies that increased facilities of intercourse between distant places, and more especially between sea-ports and the interior of a country, are among the most effective means of extending civilization, with its attendant lights and benefits. Together with the opportunities of communication, a desire to take advantage of them is diffused, and this readiness will be more decided, and the important results to be expected will follow more promptly, in proportion as the means thus presented shall combine security with convenience, and despatch with both.

The proofs and instances which sustain this assertion are not confined to the case of any one country or district; although they are more observable in communities where the resources of wealth and commerce, already possessed by the inhabitants, enable them to turn every advantage, as it arises, to immediate account. In England, wherever new channels of communication have been opened—either between different parts of the interior, or the interior and the coast, or between different sea-ports one with another, or with other countries—these opportunities have invariably been embraced without delay; and the changes so produced have been, on that account, the more striking. In less favored countries, the ability to profit by the occasion does not always exist, but must be acquired by degrees; consequently, improvement also will be gradual, and its first manifestations the more tardy.

The degree to which intercourse is not merely promoted but actually created by the facility of accomplishing it, could be scarcely credited, but for the numerous and authentic examples which establish the fact. The Omnibus traffic, of modern introduction, between different parts of London and its principal suburbs, is a familiar instance which immediately suggests itself. There is a constant succession of those conveyances, to and fro, through all the leading avenues and streets of the metropolis, and their number is increasing daily: yet, in addition to these frequent means of transfer from east to west, small steamers are continually plying between Westminster Bridge, Hungerford Market, Dyer's Wharf, and the Surrey side of London Bridge; by which many thousand persons are withdrawn every day from the Omnibus traffic; while below London Bridge the number of passengers, by steam vessels, down the Thames—also an introduction of recent date—amounts to several millions in the year.

We learn that each of the two Greenwich Steam Packet Companies carried, last year, about 400,000 passengers; that the Woolwich Old Company, calling at Greenwich, carried more than 100,000 Greenwich passengers, besides 192,000 to Woolwich; and the New Woolwich Company carried nearly 100,000 passengers between Woolwich, Blackwall, and London Bridge. To these are to be added the many thousands who pass those places to Gravesend, Margate, Ramsgate, Southend, Dover, Herne Bay, &c., &c.; and, above all, the multitudes, greatly exceeding one million, who, during the last year, passed by the Railway to Greenwich, while the public conveyances on the high road scarcely appeared diminished in number or in the frequency of their journeys.*

These may possibly be regarded as peculiar cases, incidental to the immense population of the great metropolis; but similar results are found to occur, in a proportionate degree, in places quite beyond the circle of that influence.

A writer on Statistics (G. R. Porter, Esq.) relates, that two generations back "there were no means of reaching London from Horsham, in Sussex, but on foot or on horseback—the latter not practicable in all seasons. Horsham is 36 miles from London—and the journey between the two places now occupies less than four hours. More than thirty coaches pass through it daily, to and from the metropolis, in addition to private carriages, post chaises, &c. The traffic of goods, chiefly coal and agricultural produce, carried on in the district of which Horsham is the centre, exceeds 40,000 tons in a year; besides which, the road is constantly covered with droves of cattle and flocks of sheep."

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* We believe it to be a fact, that thirty years back, the only public mode of conveyance between Woolwich and London was by coach; and two coaches, each leaving and returning twice in the day, were then deemed sufficient for the whole passenger traffic of that place. There are now omnibuses leaving twenty-four times, and returning as often, in the day; and a still greater number of vans and single-horse coaches, running, as they fill, to Greenwich only, whence most of the passengers proceed by Railway, steam-boat, or omnibus, to London.

This result has been obtained by a rise of only the first degree in the scale of improvement, namely, an excellent road, without even a canal. It is the effect of improved communications on a country of rich soil, and bears analogy to what has taken place in many parts of Ireland.

By referring to our notes, A and B, it will be seen, that on the Stockton and Darlington Line the passenger traffic, prior to the establishment of the Railway, amounted only to 4,000 persons in the year; it now exceeds 16,000. On the Bolton Line the average weekly number of passengers is 2,500, whereas the number of coach journeys out and in per week, which the Railway has superseded, amounted only to 28, carrying, perhaps, on a weekly average, about 280 or 300 persons.

On the Newcastle and Carlisle road, prior to the Railway, the whole number of persons the public coaches were licensed to carry in a week, was 343, or, both ways, 686; now the average daily number of passengers by the Railway, for the whole length, viz., 47½ miles, is 228, or 1,596 in the week.

The number of passengers on the Dundee and Newtyle Line exceeds, at this time, 50,000 annually; the estimated number of persons who performed the same journey, previous to the opening of the Railway, having been 4,000.

Previous to the opening of the Railway between Liverpool and Manchester, there were about 400 passengers per day, or 146,000 a-year, travelling between those places by coaches; whereas the present number, by Railway alone, exceeds 500,000.

In foreign countries the results arising from the same cause are equally, if not more striking. The number of persons who usually passed by the road between Brussels and Antwerp was 75,000 in the year; but since the Railroad has been opened from the former place to Malines, it has increased to 500,000; and since it was carried all through to Antwerp, the number has exceeded a million. The opening of a branch from Malines to Termonde, appears to have added 200,000 to the latter number; so that the passenger traffic of that Railroad, superseding a road traffic of only 75,000 persons, now amounts to 1,200,000.

It is remarkable that on this, as on most other Railroads, the greater number of Passengers are those who travel short distances, being as two to one compared with those who go the whole distance. This appears from a statement read by Mr. Loch, before the Statistical Society of Manchester, showing that between April 30th and August 15th, 1836, 122,417 persons travelled the whole distance, and 244,834 short distances; chiefly to and from Malines. He further states, that "nearly one-third of the whole revenue of the Railway is derived from travelling to and from Malines, and paying a fare of about 60 centimes or nearly sixpence sterling." On the same authority we learn another fact, most deserving of attention in calculating the probable success of a Railway in such a country as Ireland, viz.:—that nearly three-fifths of the whole revenue of the Company are derived from passengers of the lower class, paying a very low fare.

We have no means of precisely ascertaining the difference in the traffic of the United States of America, previous and subsequently to the establishment of Railways; but if it is allowable to judge by the effect of an inferior species of accommodation, we may conclude that it is very considerable. The *American Railroad Journal*, 1833, says, that "in 1817, when the Erie Canal was commenced, there were not more than fifty small villages within a distance of 20 miles on each side, and extending the whole length of the route; whereas there are now more than one hundred and thirty, exhibiting evidence of prosperity and wealth, besides many well cultivated and well stocked farms."

The following return, taken from *Pitkin's Statistics*, shows a great increase in the traffic of a Railway, after it has been some time at work, and may be offered as a proof of the influence which such superior facilities exercise, in proportion as they become better known, in promoting general intercourse.

Traffic on the Hudson and Mohawk Railroad, for the years 1833 *and* 1834.

1833, Passengers departing from Albany,	59,599	
,, Ditto from Schenectady,	56,155	
		115,754
1834, Passengers departing from Albany,	78,188	
,, Ditto from Schenectady,	65,290	
		143,478
Increase,	27,724.	

The number of Railroads, however, which have been established in the United States, and the unabated anxiety which still prevails there to multiply and extend them in all directions, are convincing indications, both of the high estimation in which the Americans hold such accelerated means of intercourse, and of their knowledge of their advantages. Doubtless they have experienced its powerful and effectual aid in advancing a people from a rude and half-civilized condition towards the highest state of improvement. The Railroads which were completed, or nearly so, on the 1st of January, 1835, in the United States, extended 1,600 miles in length, and their cost was thirty millions of dollars, or £8,130,000 sterling.

We shall mention one more instance somewhat distinct from those which have preceded, as showing the high degree of advantage which Steam Vessels and Railways, when so placed as to admit of their joint co-operation, may reciprocally impart and receive; and how great an impulse such a combination gives to trade and to the general intercourse of society. The instance we allude to is that of the Hull and Selby steam Packets, which conveyed 33,882 passengers in the year that preceded the opening of the Leeds and Selby Railway, and in the year following, 62,105.

We have direct proofs that Ireland is as capable as other countries of being influenced by the same cause, and of profiting by its operation; and there is this additional motive to recommend the subject for consideration, that the backward state of the country, and its not unfavourable position, present a stronger obligation, as well as a wider scope for improvement.

In the Reports and Evidence of Engineers,* and of the Board of Public Works,† the most striking effects are described as having resulted from the opening of roads through districts which had been previously shut up from intercourse with other parts of the country; the traffic which immediately ensued, in almost every instance, surpassed the most favorable calculations that had been formed of it. Frequently roads first made with gravel, which were expected to last for years, were so worn before the expiration of the second year, that it became necessary to apply substantial coverings of broken stone; and even small portions of those roads were scarcely out of the Engineer's hands, before they were covered with the carts of the Farmers, eager to take advantage of the improvement.

The enterprise and intelligence of an individual has, within the last 20 years, supplied the entire of the South, and a great portion of the West of Ireland, with means of internal communication, by a species of accommodation, and in directions, which, till then, had been unattempted. We mean a regular system of communication by cars between the provincial towns; for it is worthy of remark, that while the intercourse has been long kept up by public coaches and other vehicles, between Dublin and the great towns, and between the several places situate on those lines one with another, there was scarcely an instance of a public conveyance plying regularly by the cross roads, until the individual we allude to undertook it. We speak of Mr. Bianconi, of Clonmel, whose flourishing establishments afford a distinct and unequivocal proof that Ireland is in a condition to take advantage, speedily and effectually, of such facilities of internal communication as may occur. Mr. Bianconi is a native of Milan, who, when he settled in this country, was unacquainted even with the language spoken by its inhabitants. With a capital little exceeding the expense of the outfit, he commenced running a Car between Clonmel and Cahir. Fortune, or rather the due reward of industry and integrity, favored his first efforts, and he soon began to increase the number of his cars, and to multiply their routes, until his establishments, which are still extending themselves in all directions, spread over the whole province of Munster, passed through Kilkenny to Wexford, Carlow, and Mountmellick, in Leinster, and penetrated into the counties of Sligo and Leitrim on the north-west. He has now 94 public carriages in constant work, and the distances traversed by them exceed three thousand miles per day.

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* Parliamentary Papers on the Employment of the Poor in Ireland, 1823. Parliamentary Reports of Engineers, 1829.

† Annual Reports presented to Parliament.

These results are the more striking and instructive, as having been accomplished in a district which has been long represented as the focus of unreclaimed violence and barbarism, where neither life nor property can be deemed secure. Whilst many persons, possessing a personal interest in everything tending to improve and enrich, have been so misled or inconsiderate, as to repel, by exaggerated statements, British capital from their doors, this intelligent foreigner chose the county-town of Tipperary as the centre of his operations, wherein to embark all the fruits of his industry, in a traffic peculiarly exposed to the power and even to the caprice of the peasantry. The event has shown that his confidence in their good sense and good feeling was not ill-grounded. By a system of steady and just treatment he has maintained a complete mastery, exempt from lawless intimidation or control, over the various servants and agents employed by him; and his establishment is popular with all classes, on account of its general usefulness and of the fair and liberal principles of its management.

It should be recollected, that the success achieved by this spirited individual, is the result, not of a single experiment, which might have been favored by particular local circumstances, but of a series of distinct experiments, all of which have been successful. To attribute this to his perseverance and intelligence would be so far true, as those qualities are necessary in order to give effect to the best adapted plans, under the most favorable circumstances; but it must at the same time be obvious, that no degree of personal energy or sagacity could create a constant intercourse, where none had previously existed, had there not been in the country itself a necessity for such facilities as Mr. Bianconi introduced, and an aptitude and capability of making use of them.

To what degree such capabilities would be further called forth by the establishment of Railways, we can for the present only conjecture by their effects in other countries, and by reasoning from analogy upon the changes which much inferior accommodation has accomplished in Ireland. As yet there is but one Railway in Ireland, and that depending, perhaps, on peculiar local circumstances, and, at all events, being on too limited a scale to be fairly cited as a guarantee for the success of undertakings, in their nature and design more general and extensive. But its history, as far as it is applicable, perfectly accords with our opinion, as to the increased intercourse that follows the adoption of improved means of carrying it on. The Dublin and Kingstown Railway has been in operation for three years only; the prices are not lower than those of the ordinary road conveyances, and the line being a very short one, no considerable saving is effected in point of time; yet it has more traffic than ever was known to be on the high road, while the latter is still frequented to a great extent, with carriages, horses, and foot passengers. The owners of hackney cars, who had derived all their support from the intercourse between Dublin and Kingstown, and feared that they would be thrown out of bread by the Railway, have actually experienced an improvement in their business,—not all, indeed, being employed upon the same line as before—but finding the deficit amply made up by calls to places not directly in the line of Railway, and in journeys and excursions to and from its several stations.

The introduction of steam navigation has caused a vast increase of intercourse and of business from every part of the interior of Ireland with the coast, from which it is easily accessible. On the Lower Shannon from Limerick to Kilrush and Tarbert, a communication was established by the Dublin Steam Company, in the year 1829, by a single steam-boat going and returning on alternate days; great numbers from the counties of Limerick and Tipperary availed themselves of the opportunities thus afforded, of an easy communication with the sea-coast; and not only have the above-named towns, more particularly Kilrush, been much enriched by the constant influx of strangers, but a thriving bathing village has been created at Kilkee, on the shore of the Atlantic Ocean, where, a few years ago, nothing was to be seen but the wild mountain-heath, and some scattered hovels among the rocks upon the shore. The villages of Miltown and Ballybunnion have also become places of considerable resort and importance through the same means.

The single steam-boat, plying on alternate days, is no longer sufficient for this traffic, which now gives full employment to two packets of more capacious dimensions, departing with passengers and goods from either end of the line every day. The number of persons who were carried last year by these boats, amounted to 22,417.

On the Upper Shannon, that is, above Killaloe, one steamer of 100 horse power and smaller steam-boats have been launched within the last few years, and a regular and expeditious communication is thereby maintained between Limerick and Shannon Harbour, and thence by the Grand Canal to Dublin. The benefits of this traffic are obtained by the districts on each side of the river, as far as its junction with the canal, by means of quays erected at convenient intervals along the banks, by the Dublin Steam Packet Company, through the effective and unwearied enterprise of Mr. Charles W. Williams.

Ten thousand passengers were also carried between Cork and Cove, by steam-boats on that station, during the year 1836.

The communication between this country and Great Britain, has been greatly extended and increased since the establishment of steam packets; but, we regret, that owing to the reluctance of the private Steam Packet Companies to supply the details which we desired upon this subject, we are not enabled to state precisely the amount of the increase. The following facts, however, establish the conclusion that it must be exceedingly great; and if we should estimate it on a rough calculation, at twenty times the number carried by the sailing packets, we could scarcely be charged with exaggeration. The regular intercourse with Great Britain, previous to the year 1821, was carried on almost exclusively by the Post Office sailing packets, and the passage by Holyhead being preferable for its shortness and greater security, was then more frequented than all the rest: yet the average number who crossed the channel by that favorite route, comprehending, probably more than one-half of the entire, did not then exceed 14,600 in the year. Now that steam packets are running from every port between Cork and Londonderry to various parts of England and Scotland, the annual number of passengers to Holyhead by the Post Office steam boats is at present more than 11,000, while the passengers to Liverpool, by the packets in the same service, amount to 26,000. For the cause already intimated, we have not been able to ascertain what numbers depart daily in vessels of the several Companies for Bristol, Liverpool, and Glasgow; but the number of vessels engaged in this traffic, and constantly afloat, amount to twenty-eight, and the extent of their traffic in passengers may be conjectured by a return which we believe to be perfectly authentic, that in the course of last year 15,600 persons passed between the comparatively inconsiderable port of Drogheda and the coast of Great Britain. An inference to the same effect is also supplied by the fact that 10,000 passengers were conveyed last year by vessels making the circuitous and comparatively hazardous voyage between Dublin and London.

A striking illustration of the increase of business in Ireland, occasioned by the opening of new and convenient channels of communication, presents itself in the traffic of trading steam vessels between different ports in this country and in Great Britain. From Cork, Waterford, Wexford, Dublin, Drogheda, Dundalk, Newry, Ardglass, Belfast, Coleraine, and Londonderry, a regular and frequent intercourse is kept up by steam vessels, with London, Bristol, Liverpool, and Glasgow; from two to four of these vessels passing each way between Dublin and Liverpool every day. Nine-tenths of the traffic thus carried on may be said to be new, such as the trade in fattened cattle—a most important item in the present exports of Ireland—as also in several articles of inferior value, which it would have been too hazardous to have shipped, while subject to the chances of delay and of uncertain times of arrival, to which sailing vessels are necessarily liable. Of the extent of such transactions, a notion may be formed from the estimated amount of the export of eggs only, which is valued at £156,039 for the year 1835.

In consequence of the readiness and speed with which personal communications can be effected through these means, even the mode of trading has taken a new turn, which is generally deemed favorable to the commerce, and conducive to the increasing prosperity of the interior of Ireland. The country dealers and merchants now commonly proceed directly to Great Britain to transact their own business, instead of employing factors or agents in Dublin to do it for them. Hence the amount of business transacted is considerably increased, and its benefits being more generally diffused through the country, the effect is more advantageous to the community. Dublin has, indeed, suffered by ceasing to be the storehouse from which the provincial dealers were accustomed to draw all their supplies; but this partial ill is a general good; the public being generally better served, and on fairer terms.

A well arranged system of Railways in Ireland would have the effect of continuing, and extending throughout the country, the benefits, which the outports have thus obtained by the introduction of steam vessels. It is scarcely necessary to dwell upon the great and obvious advantages, which would result from such combined facilities of intercourse. The subsisting relations of business and commerce would be thereby extended and enlarged, and others formed, opening fresh resources to the industry and enterprise of the trading portion of the community; while an object of no less consideration would be immediately attained in rendering agricultural produce, which may be called the grand staple of this country, at the same time more profitable to the producers, and accessible on easier terms to the principal purchasers and consumers. We have already mentioned, that a considerable traffic has been formed, since the application of steam vessels to purposes of commercial transport, in the exportation of fat cattle. The direct benefit, however, derived from this trade on the part of Ireland, is confined to counties adjacent to the eastern ports, or connected with them by canals; for the condition of the animals would suffer so much by their being driven any considerable distance. that they are necessarily disposed of in some neighbouring market; and thus the great feeding counties of Limerick, Clare, and parts of Tipperary and Queen's County, are precluded from the advantages recently opened to other places. A Railway intersecting the country from Dublin, would place the cattle of those rich pastures within reach of Liverpool, Manchester, and Birmingham, thereby insuring to these markets a larger supply, and of superior quality, while the profits of the Irish feeder would be proportionally enhanced. A similar advantage would be secured, through the same means, to the growers of corn, that the prices of produce thus equalized through the whole country, land would be of nearly equal value to the cultivator, at a distance from the metropolis as in its immediate neighbourhood; and hence the inducement to expend capital and labor upon its improvement would be as strong in the one case as in the other.

An opinion, which we believe to be quite erroneous, has become prevalent, that because in the populous and wealthy districts in which Railways have been established, their traffic has consisted for the most part, in the conveyance of passengers and goods of high value—they are, therefore, ill-adapted to the conveyance of goods of bulk or of ordinary value. This notion has probably arisen from the inconvenience and difficulty hitherto experienced in combining the two purposes in such a manner as to yield a remunerative profit to the proprietors. We cannot, however, see any reason to doubt, but, on the contrary, we can see good grounds for calculating on a great extent of profitable traffic in agricultural produce and live stock, as well as in other articles.

A similar opinion, which has been proved to be quite groundless, was at first entertained with respect to steam vessels; and it was some considerable time after they had been used for the conveyance of passengers, that they were employed in carrying cargoes of grain and stock, with which they are now so extensively freighted between Ireland and Great Britain.

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Probably the best answer to such an objection as we have mentioned, will be found in the following table of the value, in tons, of the several kinds of Irish agricultural produce respectively :—

Average Value, per Ton, of Agricultural Produce in Ireland.

Butter,	per ton,	£90
Beef and Mutton,	,,	45
Bacon,	,,	42
Pork,	,,	30
Second Flour,	,,	20
Wheat,	,,	12
Oatmeal,	,,	12
Barley,	,,	8
Oats,	,,	7

Now, when we consider the intrinsic value of these commodities, why should it be thought that they cannot, for the advantage of a surer and better market, very well support the expense of Railway conveyance? We repeat, therefore, our persuasion, that besides the advantages of speed, security, and exemption from waste or deterioration, the dealer in these articles will find the Railway the most economical method of transport that he could possibly adopt.

Among the inducements which we may notice, as holding out a prospect of support for such undertakings, are to be mentioned the numbers from all parts of the United Kingdom, and even from the Continent of Europe, who would resort to Ireland, as travellers, to view the natural beauties of its splendid and varied scenery; and some, no doubt, to acquire a more perfect knowledge of the character and condition of the people. The line which we propose to Cork, passes within a morning's drive of Killarney, and through a highly picturesque country besides; and should a Railway be completed to Holyhead, or some other port in North Wales, as forming part of the plan recommended by us, with a view to the safest and most rapid communication with America, the tourist will then have an opportunity of passing through the magnificent mountain scenery of Wales, and visiting the most remarkable places both in the north and south of Ireland, at a very moderate expense, and in a few days. To many, the saving of time will be a much more valuable consideration than a reduction of expense, though the latter will, of course, operate as a strong inducement to numbers; and we have no doubt, that a considerable accession of traffic will be derived, during the summer and autumn of every year, from this source.

But the moral effects of such intercourse, will perhaps outweigh the immediate pecuniary interests involved in it, by the important influence which they will exercise on the fate of the country. Ireland, though for years past a subject of anxious attention and discussion in public, is really very little known to the British people; and the disadvantage to both countries, arising from that circumstance, is much greater than is generally supposed. Connected as they are by the same laws and identified in interests, any proposal to cement this union, by drawing their inhabitants closer together in the bonds of mutual intercourse and knowledge, claims general attention, and if it appear calculated to promote that end, should command general support.

If the lines recommended by us shall be adopted, there will, undoubtedly, be a large resort of strangers to Ireland, and great numbers will constantly pass and repass through the land. It might be enough for the shareholders and proprietors of a Railway to be assured of this, without troubling themselves to ask what business may have brought so many travellers to their trains, or whither they may go after departing from the stations. But these are questions of great interest and importance to the country; for so abundant and continuous a stream could not flow through its soil, without fertilizing and enriching it on both sides. Those frequent visitors, whether engaged in commerce, attracted by curiosity, or merely passing on to a more remote destination, must, necessarily, cause an increased activity in various departments of business, and add most considerably to the circulation of money. Thus, although a Railroad itself, as a mercantile speculation, might not, all at once, fulfil the sanguine expectations of the projectors, it would still be an invaluable source of general wealth and prosperity.

It would be an endless task to point out the various interests and social relations which would be more or less affected by the introduction of this mode of traffic on an extensive scale; but it may be proper, before we conclude this part of our subject, to advert shortly, to its probable effects upon some departments of the public service.

Of these, the Post Office naturally presents itself to the mind. The vast importance of the transmission of letters, in less than half of the ordinary time, needs but to be mentioned. There is not a merchant, or man of extensive business, but can readily appeal to instances of the great value of even a few hours saved in the carriage of letters; and it has been shown, that by the Railway, entire days may be saved in the post between London and many parts of Ireland.

We may contemplate, as another example, the effects on the military service of the country; the facility of moving troops in large bodies, hundreds of miles within a few hours, fully supplied with Artillery and Stores of all kinds, and in a state of perfect readiness, either to oppose foreign aggression or repress domestic outrage, must be apparent; and its influence upon the security of the public peace can scarcely be overrated.

But it is needless to multiply instances of the application of this principle, as far as its powers have been ascertained, to the actual concerns of the country, and it would be folly to attempt to impose limits to its future influences in creating new resources for the population, or in giving directions as yet unknown, to those already possessed. The French Minister of Public Works, in a late address to the Chamber of Deputies, says, "Railways are assuredly next to the invention of Printing, the most powerful instrument of civilisation that the ingenuity of man has ever devised. It is difficult, if not impossible, to foresee and define the results which they must, of necessity, at some period produce on the fate of nations." The observation does not appear to be in the least overstrained. The mind can scarcely set bounds to the extent to which the effects of so important a discovery may be carried, nor the imagination take too wide a scope in speculating upon its future operations. What has been already done upon its very threshold, and as it were in the dark, seems but an earnest of advantages to come, when experience shall have shed its full light upon the subject, and brought this wondrous power more within the grasp and the command of man.

3. CONCLUSION;—SUGGESTIONS AND RECOMMENDATIONS AS TO THE EXTENT OF PUBLIC AID WHICH IT MIGHT BE ADVISABLE TO AFFORD,—THE MANNER IN WHICH IT MIGHT BE GIVEN, AND UNDER WHAT CONDITIONS.

Having now examined the principles by which a general system for Railways in Ireland should be regulated, and laid down lines which would, as we conceive, be the most beneficial to the country, we shall conclude our Report with a few suggestions as to the means and the manner of carrying those projects, either altogether or in part, into execution, and some observations upon the principles on which Railway Bills should be framed for the mutual benefit of the public and the Companies.

There can be no doubt that parties might be found, ready to undertake certain portions of these lines, which hold out special prospects of advantage; such, for example, as the first twenty or thirty miles leading out of Dublin, over which all the traffic with other places, near as well as remote, must necessarily pass. But since, according to our calculations, the return of profit on the whole system could not be expected, for some time, to exceed $3\frac{1}{2}$ or 4 per cent., it is manifest, that if the best and most productive portions are taken possession of unconditionally, there can be no reasonable hope that the remainder will ever be carried into effect. This would so completely frustrate the most important of the objects contemplated in issuing this Commission, by opposing a bar to the future improvement of the country, that we trust it will not be in any case permitted. It would be even more advisable that no partial line should be sanctioned until the country should

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possess within itself the means of undertaking the whole system to its full extent, than at once and for ever to obstruct and paralyse all future exertions for its accomplishment, by abandoning, to parties having particular and distinct interests, the monopoly of some of its most productive detached portions.

We, therefore, earnestly recommend, that every effort be made to combine into one interest, and under one management and control, the whole of the southern system of intercommunication between Dublin and Cork, Limerick, Waterford, and Kilkenny; and that the Northern Line, by Navan—to Armagh at least—be treated according to the same principle, and considered as one concern.*

If a body of capitalists be found ready to undertake either of these great works, as a whole, we presume that the general feeling of the Legislature and of the country, will be to leave the execution of it as little fettered as possible by restriction, to the management of private enterprize; and in addition to this, it would be just and advisable to relieve them from all needless expenses to which otherwise, in the existing state of the law, they would be liable. With this view, we recommend particularly, that the Act of Parliament be granted free of any charge, as for a public measure; that a mode of determining the amounts to be paid in compensation of land and damages, be adopted, on principles more fixed and independent of private or local bias than the present practice; and that some general enactment be provided, authorising, to a certain extent, alterations of obvious utility, to be introduced in the original plan, without the costly expedient of resorting, in every case, to Parliament for a new or amended Act.

But the investigations which we have made lead us to doubt whether any Company will be induced to undertake either of these great lines, even with the facilities and advantages which might, on general principles, be afforded them. In such case we trust, that to avoid the evil of partial execution, and to accomplish so important a national object as that contemplated in the completion of the entire system, we may look forward to a certain degree of assistance from the State, as great, at least, as has been given for the encouragement of other public works in Ireland; and on those grounds of policy, which, we believe, have not been disputed, and on which it is therefore unnecessary for us to enlarge.

We feel not only the difficulty of the subject, but also, that we should be exceeding the bounds of our instructions, to enter minutely into the precise form and amount of the aid which we have ventured to express our hope may be afforded. At the same time, the following suggestions may not be considered irrelevant, as to the different modes by which the State might render great assistance, in forwarding these important objects, without injury to other public interests; they are offered merely as suggestions of principles which may be deserving of consideration, and as admitting of modifications in their details, so as to form the ground work of an agreement between the Government and the parties interested. We proceed, therefore, to suggest,—

First, That Government should advance, by way of loan, a considerable proportion of the amount of the estimates, at the lowest rate of interest, and on the easiest terms of repayment, to be secured by a mortgage of the works. We think that many landholders may also be found to subscribe towards carrying into effect an object which, in addition to its importance as a national concern, cannot fail to benefit and improve their own properties.

As a further assistance in filling the subscriptions, perhaps powers might be given to the counties interested, as well as to corporate towns, to become shareholders to certain amounts; the Government, in such case, advancing the money on the security of presentments, in the usual manner, and the return on such shares being available for the reduction of the county or other rates.

A provision, however, will be necessary, in this case, to insure the co-operation of the whole of the districts interested—the approval of a certain majority having been obtained.

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* We should have wished the general arrangement to have included in the line, the distance between Armagh and Belfast; but as that is already occupied by a Company in full operation with the works, it is to be hoped that a readiness to unite in the same system for fares, &c., as shall be adopted for the rest, may render the ruinous expedient of a distinct line into Belfast unnecessary.

Secondly, If these means be rejected, or fail to produce sufficient subscriptions to insure, in the first instance, the execution of the entire system, we would suggest, that the work might still be allowed to go forward—beginning at Dublin, or other fixed terminus, to any other determinate point, such portion, however, not to be considered as an integral line, but only as a part of the general system, and to be continued from that point towards the ultimate intended termini of the several lines and branches, as new subscriptions are received. The subscribers to these continuations should be entitled to all the privileges and advantages arising from the whole portion of the line already executed, from the date of the payment of their respective subscriptions, equitably estimated according to the time when each subscription shall be made.

Thirdly, We would further venture to suggest, that the Government should undertake either or both of the proposed combined lines, on the application of the counties interested; the outlay to be repaid by small instalments, at the lowest admissible rate of interest, and under the provision, that in the event of the returns not paying the stipulated amount of interest, the counties shall supply the deficit by presentments.

In offering this proposition, we may be allowed to state, that relying on the result of our estimates, our impression is, that the local districts, under such an arrangement would, to insure a certain great benefit, incur but a very inconsiderable risk, freeing themselves, at the same time, from many inconvenient arrangements.

This proposition is somewhat on the principle adopted for the improvement of the Shannon Navigation. It is, of course, susceptible of various forms and modifications; but we purposely avoid entering into details, which, however, we see no difficulty in filling up to suit all the circumstances of the case.

Act 5 & 6 Wm IV., cap. 67.

Should either of the two latter suggestions be adopted, the Government will possess an immediate interest in the due execution of the work, and must, of course, have a great share in its direction. But even were the work undertaken without public aid, we are still of opinion that it should, in a certain degree, be subject to the control of the State.

It is a favourite opinion with many, that all undertakings of this description are best left to the free and unfettered exercise of private enterprize, and that the less the State interferes, either in prescribing their execution, or controlling their subsequent operation and management, the better.

We are fully sensible of the great advantages to be obtained by allowing full scope to the vigour, energy, and intelligence of individuals associated for such important purposes; and that it would be equally inconsistent with the interests and with the rights of society were such exertions crippled or restrained by unnecessary or impolitic regulations. But we apprehend, that the essential difference between Railways and any other description of public works has been overlooked, and that power and privileges have been conceded to private Companies, which should be exercised only under the direct authority of the State, or under regulations enforced by effective superintendence and control.

So great are the powers, so vast the capabilities of a Railroad, that it must, wherever established, at once supersede the common road; and not only will all the public conveyances now in use, disappear, but even the means of posting will, in all probability, rapidly decline, and eventually, perhaps, cease to be found along its line. These effects may be expected as the necessary consequences of opening a Railway. Its superiority is too manifest and decided to admit of rivalry; it possesses almost unlimited means of accommodation; no amount of traffic exists on any road, or is likely to exist, which a single Railway is not capable of conveying; no concourse of passengers, which it cannot promptly dispose of; the velocity of the locomotive, when impelled even at a very considerable reduction of its full power, surpasses the greatest speed which the best appointed coach, on the best made road, can maintain: in short, where the capabilities of the system are brought fully into operation, they present such an accumulation of advantages, as to render it an instrument of unequalled power in advancing the prosperity of a country.

It therefore deeply concerns the public, whose welfare is inseparably connected with all that tends to improve the internal resources, or to maintain the commercial and manufacturing superiority of these countries, that such works

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should be promoted; and, consequently, every encouragement, consistent with the regard due to other interests, should be given to capitalists, who may be willing to undertake them. Their propositions should be submitted to a competent and duly constituted tribunal; and, if approved, should be adopted and stamped, as national enterprises. As such, they should be protected from all unnecessary expense—from extravagant demands for compensation—from vexatious opposition, and from the ruinous competition of other Companies. To that extent they have a strong claim on the protection of the State.

But, on the other hand, the public interest would require that they should be bound by such conditions, and held subject to such well-considered regulations and effective control, as shall secure to the country at large the full benefit and accommodation of this admirable system.

The practice hitherto followed in England has been almost the very reverse of that which we here recommend. No preliminary steps are taken on behalf of the public, to ascertain whether the proposed Railroad be well adapted to its specific object, or calculated to form a part of a more general system. The best and the worst devised schemes are entertained alike, being equally exposed to opposition, and left equally unprotected against the difficulties which interested parties may raise up against them. Nay,—a Railway Bill may be passed, or it may be rejected; but the fate of the project merely proves the number and influence of its respective supporters or opponents. Its failure or success is no test whatever of its merits, as a measure of general utility; for that consideration forms a very small part of the inquiry before Parliament.

The principal points which, on application for an Act, the projectors of a Railroad are required to establish before Parliament are these:—

1st. That the probable traffic be sufficient to justify such an establishment;

2nd. That the project for effecting the given object be so planned as to produce good mechanical results;

3rd. That adequate funds be secured for carrying it into execution;

4th. That private property be not unduly interfered with.

Of these, the second alone bears reference to the future efficiency of the work; and even this confines the attention of Parliament to one only of the many important questions in which the interests and accommodation of the public are involved. It also relates to a subject so professional in its nature, that it is not to be expected that a Parliamentary Committee, constituted as such tribunals generally are, should be competent to examine or decide upon it.

Should the parties succeed in obtaining a favorable Report, they are usually empowered to proceed, and to hold the work as any other description of private property, subject to little or no external regulation or control. Hence are they enabled to establish a monopoly, in the most extensive sense, and to keep the intercourse of the country entirely at their command. The rate of speed, the choice of hours for departing, the number of journeys in the day, rest at their discretion; and as they have the unlimited right of fixing the charges for the conveyance both of passengers and goods, they then have an opportunity of repaying themselves, not only for the legitimate costs of constructing and maintaining the Railway, but for all the heavy expenditure incurred, either through their own extravagance, or in consequence of the various impositions practised upon them. Thus, every item of unnecessary expense falls eventually upon the public.

Sanguine anticipations have been formed of the advantages, already enumerated, of rapidity, facility, frequency, and economy, which this mode of communication is unquestionably calculated to afford. But it will depend greatly upon the will of the Railway Companies, as at present constituted, to what extent such expectations shall be realised.

With respect to the first of those advantages, that of rapidity, it is known that as the speed increases, the expenses increase in so high a proportion, that it may be apprehended there will be a strong temptation to bring down the velocity to a rate not much exceeding the best public conveyances which the Railway will have superseded.

Next, as to facility of communication, the existence of separate Companies along the same line, without a provision to regulate and enforce their co-operation, may be productive of the greatest inconvenience; and it is already exemplified in the most important line in the kingdom—that from London to Liverpool. It is a matter of notoriety, that a junction of the two lines, near Birmingham, might readily have been effected, and by that means the inconvenience and delay of transferring goods and passengers avoided.

It has been avowed by certain Companies, that it is their intention not to run their Carriages on a Sunday. If they exercise such a power, it will be tantamount to locking the turnpike-gates on common roads; for, although most Acts allow individuals to run their own carriages, and even their own locomotives on Railways, this privilege is only allowed, subject to the approval and regulations of the Company. Scarcely, under any circumstances, does it appear to us that an individual could take advantage of such permission; but it is evident, that while accompanied by the condition we have named, it becomes wholly inoperative, as a remedy for any inconvenient regulation which a Company may think it right to enforce.

Lastly, as to economy; it may, without fear of contradiction, be stated, that the practice hitherto followed leads necessarily, to the highest possible rates of charge. The expenses, which are generally excessive, of obtaining the sanction of Parliament, the exorbitant payments frequently extorted as compensation, or to buy off a vexatious opposition; the superfluous and wasteful profusion often displayed in the construction of the work itself, all concur to demand a large return from the public; which the proprietors, as carriers, being unrestricted as to the rates of charge, will not fail to enforce. And they will the less scruple to do so, because competition, the usual remedy against a disregard of the public accommodation, would be ruinous, and can, in such cases, be rarely resorted to.

We ventured, in our first Report, to point out the probable consequences of confiding such unrestricted powers to private and irresponsible individuals; as regards the conveyance of the mails, these have already begun to manifest themselves; but they are trifling when compared with the serious evils, which, we fear, must inevitably result from such improvident concessions. We believe that Railway travelling will continue to maintain a superiority over that which it has superseded; but there is reason to fear that it will be far below what the country might have derived under better regulations; when this is perceived and understood, the satisfaction which is now felt, will give way to discontent and complaint, and retrospective legislation will supply but a partial and imperfect remedy.

It might be well to look to the proceedings of other countries, in reference to this important matter. In France the main lines have been laid out under the immediate direction of the Government, and the conditions made known, on which private Companies will be empowered to construct and work them. America, as might be expected, from its separate and independent jurisdictions, has proceeded less systematically; but the several States have, in general, become shareholders to a large amount, and have thus acquired great influence in the direction of the Railways undertaken within their respective limits.

In England alone, the main lines of communication have been committed to the direction of individuals, almost unconditionally, and without control. We believe this has arisen, in a great measure, from the suddenness with which this invention burst upon the country, and the imperfect view which has as yet been taken of its extraordinary power, as well as of the extent to which the public interests are involved in its just application and management.

But to whatever cause this may be attributed, we have deemed it our duty, before closing our Report, to urge these important considerations on public attention, in the earnest hope, that in Ireland, where the ground is yet untrodden, every precaution may be taken, and every measure adopted, which can contribute, on the one hand, to the encouragement of the capitalist, and, on the other, to secure to the country the full and entire benefit which the Railway system is capable of affording.

We humbly submit this, our Second and final Report, to your Majesty's consideration.

T. DRUMMOND, (L. S.)
J. F. BURGOYNE, (L. S.)
PETER BARLOW, (L. S.)
RICHARD GRIFFITH, (L. S.)

Dublin, 13*th July*, 1838.

HARRY D. JONES, *Secretary*.

NOTES REFERRED TO IN REPORT, PARTS II. & III.

NOTE A.

Note A.
Traffic on several existing Railways.

STATEMENT OF THE ACTUAL TRAFFIC ON SEVERAL EXISTING RAILWAYS, ITS INCREASE SINCE THE OPENING OF THESE LINES, THE PREVIOUS ROAD TRAFFIC, &c. &c. &c.

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Liverpool and Manchester Railway, opened 16th September, 1830.

Liverpool and Manchester Railway.

Statement of the number of Passengers booked at the offices of the Company in each successive half year, from July 1st, 1831, to December 31st, 1836, and the Receipts during the same period.

[*Note*.—The numbers do not include the Passengers taken up on the road, but the sums stated include the whole receipt.]

Half Year ending	Year.	No. of Passengers.	Receipts.		
			£	s.	d.
June 30th,	1831	188,726	43,600	0	0
December 31st,	1831	256,321	58,348	10	0
June 30th,	1832	174,122	40,044	14	7
December 31st,	1832	182,823	43,120	6	11
June 30th,	1833	171,421	44,130	17	2
December 31st,	1833	215,071	54,685	6	11
June 30th,	1834	200,676	50,770	16	11
December 31st,	1834	238,153*	60,292	7	4
June 30th,	1835	206,856*	52,437	3	4
December 31st,	1835	268,197*	67,897	19	2
June 30th,	1836	228,866*	57,914	2	6

[*Note*.—The number of Passengers carried is not stated in the Company's returns from December, 1834; the numbers, therefore, marked with asterisks are estimated from the receipts.]

Statement of the number of Tons of Merchandise carried between Liverpool and Manchester, for each successive half year, from July 1st, 1831, to December 31st, 1836, and the Receipts for Merchandise during the same period.

[*Note*.—The tonnage does not include certain road traffic, but the receipt applies to the whole.]

Half Year ending	Year.	No. of Tons.	Receipts.		
			£	s.	d.
December 31st,	1831	52,224	30,784	17	8
June 30th,	1832	54,174	32,477	14	0
December 31st,	1832	61,995	34,977	12	7
June 30th,	1833	68,284	39,301	17	3
December 31st,	1833	69,806	39,957	16	8
June 30th,	1834	69,522	41,087	19	5
December 31st,	1834	69,911*	41,197	18	6
June 30th,	1835	74,042*	43,631	1	4
December 31st,	1835	78,698*	46,375	15	8
June 30th,	1836	80,507*	47,441	1	1
December 31st,	1836	—	—		

[*Note*.—The number of Tons carried is not stated in the Company's returns, from December, 1834, to December, 1836. The above numbers marked with asterisks are computed from the receipts.]

Beside this tonnage carried the whole way, there are a considerable number of tons, perhaps half as many as the above, carried to various distances, at a medium of about one-half, or 15 miles.

Statement of the quantities of Coals carried on the Liverpool and Manchester Line, from July 1st, 1831, to December 31st, 1836, and the Receipts during the same period.

Half Year ending	Year.	Tons of Coals.	Receipts.		
			£	s.	d.
December 31st,	1831	8,396	695	14	4
June 30th,	1832	29,456	2,184	7	6
December 31st,	1832	39,940	2,804	3	4
June 30th,	1833	41,375	2,638	15	9
December 31st,	1833	40,134	2,591	6	6
June 30th,	1834	46,039	2,925	15	11
December 31st,	1834	53,505*	3,408	16	4
June 30th,	1835	53,474*	3,406	11	4
December 31st,	1835	57,807*	3,682	8	8
June 30th,	1836	62,800*	4,000	8	4
December 31st,	1836	—	—		

[*Note*.—The number of tons carried from December, 1834, to December, 1836, are not stated in the Company's return. The above numbers marked with asterisks are computed from the receipts.]

Note A.
Traffic on several existing Railways.

Referring to the first of the preceding statements it will appear, if we reject the result shown in the second half year after the opening, (the great number in this period being the mere temporary effect of curiosity,) it will be seen that the present passenger traffic exceeds that at the commencement by about one-third, showing an increase of about 33 per cent. The merchandise indicates an increased traffic of 50 per cent, and the Coals since 1832, of nearly 100 per cent.

STOCKTON AND DARLINGTON RAILWAY.

Stockton and Darlington Railway.

We have not here the same minute statement of the increase of traffic since the commencement; nor would the comparison, if we had the data, be so satisfactory, because the original line has been considerably extended, various branches added, and the whole design greatly altered.

It consists now of 54 miles, including branches, of which

18 miles are single lines, with 400 yards double every mile.
8 miles, with 3, 4, 5, and 6 ways.
28 miles of double way.

The original estimated traffic for Coal for home consumption was 70,000 tons per annum, it now amounts to 110,000 tons.

Traffic in Coal for exportation was not contemplated in the original design; it now carries 400,000 tons annually.

The Passenger traffic by coach, prior to the Railway was, between Stockton and Darlington, 4,000. The present traffic by the Railway amounts to 16,000.

The Passenger revenue per annum is £5,000, and the gross income £70,000.*

BOLTON, LEIGH, AND KENYON AND LEIGH RAILWAYS.

Bolton and Leigh, and Kenyon and Leigh Railways.

It appears by a letter received from Peter Sinclair, Esq., Treasurer and Engineer, that on these lines the number of Passengers carried in 6 months, ending October 16th, 1836, amounted to between 50,000 and 60,000, or about 10,000 per month, although the Railway has only superseded one stage coach, which ran daily out and in, and four others which ran each one day in the week only.

The traffic in goods has been considerable; amounting in Merchandise to about 130 tons, and Coal between 200 and 300 tons daily.

In reference to the carriage of goods, the same intelligent writer states, that previous to the opening of the Bolton and Leigh line, the ordinary charge for the conveyance of Merchandise between Liverpool and Bolton was fifteen shillings per ton, and that the conveyance was extremely uncertain; timber and other goods being frequently weeks on the way, though there were three modes of conveyance by canal; one into the town, and the other two coming within 6 or 7 miles of it.

The effect of the Railway has been not only to reduce the charge to 10 shillings per ton, but to reduce the time of conveyance to a few hours; for the canal carriers, immediately upon the opening of the Railway, made arrangements by which they were enabled to deliver almost as quickly as by the Railway, and have continued to do so ever since.

The reduction of the cost of carriage has, upon the quantity moved into and out of Bolton, caused a saving to the manufacturers and consumers in Bolton of £5,000 or £6,000 a-year; and the benefit which must have resulted to the same class of persons by the facility of communication both as to persons and goods, superseding the necessity of keeping large stocks in hand, and at the same time to meet the fluctuations in the markets, has no doubt been very great †

NEWCASTLE AND CARLISLE RAILWAY.

Newcastle and Carlisle Railway.

This line is not yet completed, but it has been at work on different parts, since March 9th, 1835. There are now 47½ miles of way open, the intermediate part being travelled by Coaches. The following is a statement furnished by the Company, showing the amount of traffic in passengers up to October, 1836, together with the amount of previous coach traffic.

Previous to opening the Railway (17 miles), on 9th of March, 1835, the following coaches were employed in the district between Newcastle and Carlisle:—

The Mail, 7 days in the week, licensed to carry 7 passengers. The True Briton, 6 days, 15 passengers, during 4 months, and 12 passengers during 8 months.

These coaches ran daily both ways; but as they were supposed to carry, on an average, only half their number, the number would probably not exceed 3000 to 3300 persons in six months.

A coach, called the Balloon, ran 3 days in the week from Newcastle to Haydon Bridge, thence to Penrith, returning alternate days; licensed to carry 12 passengers.

The British Queen and the Doctor Syntax plied between Newcastle and Hexham, licensed to carry 15 passengers, each, daily both ways, and were supposed to carry, on an average, about half their number.

Since opening the Railway the traffic in passengers has been as follows:—

		Miles ‡
Upon 17 miles.	9th of March to the 28th of March, number of miles travelled was -	35,394
	The engine discontinued running for five weeks and resumed, 5th May to 10th October, 1835, the number of miles travelled was -	712,691
	10th October, 1835, to 5th April, 1836 - - - - - -	459,289
	5th April, 1836, to 28th June, when a further portion was opened,	327,857
24 miles,	28th June to 19th July, when a further portion was opened, - -	149,927
43 miles,	19th July to 10th October, when a further portion was opened, - -	799,737

(Signed) JOHN CHALLONER.

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* See a letter from Mr. Pease, given Appendix A, No. 11.

† See Mr. Sinclair's letter, Appendix A, No. 12.

‡ These numbers are found by multiplying the number of persons by the number of miles. And by dividing the totals by the number of days, multiplied by the distance opened, there is obtained the following means, expressing the equivalent number of passengers which passed each day the whole distance, viz.—

On the first 17 miles, ...	361 Passengers per day
On the first 24 miles, ...	284 do. do.
On the first 43 miles, ...	224 do. do.

But as a very great number of passengers, in the two latter periods, did not go the whole distance, the actual daily number of passengers greatly exceeds what is here stated.

Note A.
Traffic on several existing Railways.

Newcastle and Carlisle Railway.

P. S.—Since the preceding was at the press, we have received a statement from Mr. Adamson, Secretary of the above line, furnishing the result of the traffic in passengers, from October 10th, 1836, to October 10th, 1837, as follows: viz., multiplying each passenger as before by the miles travelled, the total amount for

43 miles,	From October 10th, 1836, to April 5th, 1837, during part of which time 47½ miles were open	891,061
47½ miles,	April 5th, 1836, to October 10th, 1837,	1,974,924

And it is remarked, that being in a district where there is a considerable county population which travel to and from market, the number that go short distances is very great.

Grand Junction Railway.

GRAND JUNCTION RAILWAY.

Opened July 4th, 1837, to December 31st, 1837.

		£.	s.	d.
Gross sum expended on the construction		1,607,490	10	10
Number of passengers conveyed,	232,202			
The gross receipts for passengers and parcels only, and for the conveyance of mails		116,740	10	7
Clear balance of profit		56,035	0	0

And it is here again remarked, in the Report of the Directors, that the number of intermediate passengers is very great, in comparison to the whole, not more than one-half of the whole number passing through any one township.

The foregoing are the principal English lines to which we are enabled to refer as examples of Railway traffic after completion, and of the increase compared with the previous road traffic. But we may add the following in Ireland, Scotland, and Belgium.

Dublin and Kingstown Railway.

DUBLIN AND KINGSTOWN RAILWAY.

This is, at present, wholly a passenger Railway, about 6 miles in length. The public road traffic, previous to the construction of the line, was carried on principally by cars, besides which there were many private carriages, saddle-horses, and other conveyances. To ascertain the amount of previous traffic, persons were employed to note the number which passed between six o'clock in the morning and nine o'clock at night, for 37 weeks, *i. e.*, from the 14th of February to 30th October, and the result was, 29,256 private carriages, 5,999 hackney coaches, 113,945 private jaunting cars, 149,754 public jaunting cars, 20,070 gigs, 40,485 saddle-horses, and 58,297 carts.

From the amount of general traffic, thus ascertained, the estimate of probable Railway traffic was made up on public cars only, viz.,

37 weeks,		149,754 cars
15 weeks, at same rate,	60,711	45,533
Deduct 25 per cent. for difference of season,	15,178	
Number of cars,		195,287
Allowing four persons to each,		4
Annual number,		781,148
Estimated increase,		390,574
Total,		1,171,722

Which, at 6*d.* each, amounts to an annual revenue of £29,293.

The actual numbers conveyed since the opening, December 17th, 1834, have been

	Passengers.	£	s.	d.
From December 17th, 1834, to 1st March, 1835,	139,829	4,177	9	8
From March 1st, 1835, to March 1st, 1836,	1,097, 971	31,138	6	8
From March 1st, 1836, to March 1st, 1837,	1,184,428	31,901	5	10

The general daily average number of passengers being about 3000.

Dundee and Newtyle Railway.

DUNDEE AND NEWTYLE RAILWAY.

This line is about 10½ miles in length, its summit level about 500 feet. During the years 1832 and 1833 it was worked by horses, and since that time by locomotive power.

The following is a statement of the traffic in passengers, from the commencement to the end of 1836.

	Per Annum.
Estimated number prior to the Railway,	4,000
The actual number in 1832, the Railway being worked by horses,	31,109
Do. 1833, do. do.	29,702
Do. 1833, do. by locomotive power,	49,140
Do. 1835, do. do.	54,756
Do. 1836, do. do.	51,560

In the latter year the fares were raised; the first class seats from 1*s.* 6*d.* to 1*s.* 8*d.*; the second class, from 1*s.* to 1*s.* 3*d.*; and a third class of 1*s.* seats was added.

Note A.
Traffic on several existing Railways.

Brussels and Antwerp Railway.

BRUSSELS AND ANTWERP RAILWAY.

This is a union of two lines from Brussels to Mechlin, distance about 13½ English miles, and from Mechlin to Antwerp, about 14¾ English miles.

The total number of passengers carried on the road between the two extremes, was about 80,000 annually, conveyed in from 15 to 20 diligences, besides canal passengers, the number of which is not stated.

The line from Brussels to Mechlin was first opened 7th May, 1835; and the number of passengers conveyed by it to the end of April, 1836, was 563,607; and from the 1st of January, 1836, to 31st December, 1836, the number conveyed amounted to 872,893.

The other part of the line, from Mechlin to Antwerp, opened May 1st, 1836, and from that time to August 15th, the number of passengers (long and short stages) was 369,452; and from August 1st to October 31st, 256,673, making a total of 626,125 passengers, of which 187,233 traversed the whole distance. The remaining part went only to intermediate stations.

NOTE B.

Note B.
Comparison of Profits of several existing Railways.

COMPARISON OF THE PROFITS WITH THE ENTIRE REVENUE OF THE LIVERPOOL AND MANCHESTER AND OTHER RAILWAYS.

Liverpool and Manchester Railway.

LIVERPOOL and MANCHESTER RAILWAY.

Statement of the Revenue, Expenses, (deducting the interest of loans,) and net profit of the Liverpool and Manchester Railway for ten successive half years, from July 1st, 1830, to June 30th, 1836.

Whole Revenue for each half year.			Expenses, deducting the interest of Loans.			Net Profit, including interest of Loans.			Ratio of Revenue to Profit.	Revenue per Annum.		
£	s.	d.	£	s.	d.	£	s.	d.		£	s.	d.
89,809	2	0	46,288	11	2	43,520	10	10	1 to .484	164,515	18	1
74,706	16	1	40,691	16	5	34,014	19	8	1 to .455			
80,902	2	10	43,722	13	3	37,179	9	7	1 to .459	166,973	12	0
86,071	10	2	47,532	17	4	38,538	12	10	1 to .447			
97,234	10	1	51,209	15	5	46,024	14	8	1 to .473	192,019	2	1
94,784	12	0	54,546	11	11	40,238	0	1	1 to .424			
104,899	2	2	57,827	1	2	47,072	1	0	1 to .448	204,373	18	2
99,474	16	0	54,936	4	8	44,538	11	4	1 to .447			
117,956	3	6	62,939	2	8	55,017	0	10	1 to .466	227,311	3	6
109,355	0	0	63,271	12	5	46,083	7	7	1 to .421			

The mean of these gives the following proportional numbers, viz.: Revenue, 100; Expenses, 55; Profits, 45.

On examining the preceding table it will appear, at first, extraordinary, that with an increased traffic and revenue of nearly 50 per cent., the profits of the last year should not be proportionably greater (whereas they are actually less) than in the first years. Some part of the anomaly must be attributed to the relaying the road with heavier rails, which incurred in the last half year, including the regular cost of maintenance, an expense of £5,749 4*s.* 2*d.*, but if this whole charge be added to the profit account, making it £51,832 11*s.* 9*d.*, still the ratio of revenue to profit would be 1 : ·473, which is precisely that stated in the table for the fifth half year.

Mr. Booth, the Secretary of this original line, and whose acute mind has been given to the important interest involved in such works, offers some remarks on this point in his letter to the Commissioners, which cannot be better given than in his own words. After some preliminary statements he proceeds:—

"On contemplating the result of six years' experience in the working of the first great public Railway, it becomes an interesting question how far this experience may safely be taken as a guide in reference to other Railways, or for the future in reference to our own; and if I should feel disposed to answer in the affirmative, and farther to express an expectation, that with the benefit of past experience, future undertakings may be able to diminish their proportionate expenditure, I should do so from a strong impression that such will be the fact, from a general view of all the circumstances of the case, (and these circumstances are both numerous and complex,) rather than from actual experience having testified to any gradual decrease of expenditure in proportion to the gross receipts Experience has not shown such a result. Our disbursements, in proportion to our receipts are, at this time heavier than at any former period. Another circumstance should also be taken into consideration, namely, that the traffic on the Manchester and Liverpool Railway yields a very large gross income, amounting to about £200,000 per annum, or nearly £7,000 per mile; and experience abundantly proves that a large traffic can be conducted far more economically than a small one; and hence it becomes obvious, though one Rail with a given traffic yield a net income of 10 per cent., it by no means follows that the same traffic divided between two Railways, would yield to each, a net income of 5 per cent.

"Some explanation, therefore, seems requisite of the ground of my expectations, that a more economical working will obtain, in future undertakings—mainly it is this:—The Liverpool and Manchester Railway, in reference to the formation of the road, and to all its moving machinery, is yet far from being completed. From the opening of the Railway to the present time, and more especially for the last 12 or 18 months, we have been in a state of transition, passing from the defective and imperfect, in form and construction, to more improved forms, and especially to increased strength in engines, coaches, and waggons.

Note B.

Comparison of Profits of several existing Railways.

Liverpool and Manchester Railway.

"In the original formation of the road, imperfect rails, insufficient sleepers, and inadequate drainings have been and still are the cause of heavy and constant expenditure; gradually these defects are in course of being remedied, but time and money are indispensable in this process, and the work of transition from wrong to right is far from being accomplished; further time will be needed, and further sums must be expended. New Railways will have a great advantage in this respect. In the formation of the road, in the mechanism of the engines, in the construction of the carriages, in every thing which constitutes the working of a Railway, they will start at a point which we have not yet reached, or only in solitary instances. Under such circumstances, and with an improved system from the commencement, it seems reasonable to anticipate, that with an equal traffic their comparative disbursements will be less; but as to how much less, we have literally no experience to guide us."*

It is requisite, however, that we should form the best estimate in our power on this important point, because upon it depends, in a great measure, the question as to the extent to which it will be desirable to carry the establishment of Railways in Ireland. We shall proceed, therefore, to analyze the amount of receipt and expenditure in one or two other cases.

Dublin and Kingstown Railway.

Dublin and Kingstown Railway.

Statement of the **Revenue, Expenses,** and **Net Profits** of the **Dublin** and **Kingstown Railway,** from 17th December, 1834, to March 1st, 1837.

The Railway having opened in December, 1834, and the accounts being made up, agreeably to the Act of Parliament, every 1st of March, the amount of Revenue, Expense, and net Profit in the following statement embraces a period of 14½ months.

	£	s.	d.
The income derivable from the traffic during this period *i. e.*, to March 1st, 1836, was - - - - - -	35,699	5	6
Expenses for the same period independent of the interest of loans, repayments, &c. - - - - - -	20,382	15	10
Leaving a gross profit of - - - - -	15,316	9	8
Making the ratio of Revenue to profit as 1 to ·429.			
Second period from March 1st, 1836, *to March* 1st, 1837.			
Income, - - - - - -	32,655	13	10
Expense, independent of interest and payments - - -	18,247	18	10
Leaving a gross profit, - - - - -	14,407	15	0
Ratio of Revenue to profit, 1 to ·441.			

Of the above expenses it appears that the costs for locomotive power in the first period was £11,061 8*s.* 5*d.* in which is included £4,428 0*s.* 11*d.* for fuel only.

This statement shows how important a consideration the expense of fuel is in the economy of Railway working. On this line, and on the Liverpool and Manchester, the Bolton and Kenyon, and others in that neighbourhood, the average price of coke is about 23*s.* 6*d.* per ton, and it appears by a statement with which we have been furnished by the London and Birmingham Railway Company, that in the employment they have made of a locomotive in constructing part of their line, their coke costs 46*s.* 8*d.* per ton, while on the Carlisle and Newcastle line the price of coke varies from 8*s.* to 9*s.* 6*d.* per ton.

To have performed the same duty, therefore, on these three lines, there would be the following striking differences in the charge for fuel alone:—

Dublin and Kingstown, - -	£4,428	0	11
London and Birmingham, - -	8,856	1	10
Carlisle and Newcastle, - -	1,771	4	2

With this great difference in the charge for so important an element in locomotive practice, it is impossible to state the ratio of revenue to expense and profit with any certainty; yet it is singular that the average ratio, in two lines so differently circumstanced as the above should be so closely approximative, and still more, that it should hold good also in the case of the Brussels and Mechlin line, on which it appears the Revenue for the first year was as below, *i. e.*

Revenue, - - - - -	359,392 francs,
Expense, - - - - -	183,913
Profit, - - - - - -	175,479

Ratio of Revenue to profit 1 to ·488.

We have not the data for making this comparison on other lines; but as far as these go, comparing the whole of the preceding ratios with each other, we are perhaps justified in assuming, that on lines of abundant traffic the ratio of expense to profit varies in about the ratio of 55 to 45, or in less numbers in the ratio of about 11 to 9, as we have assumed it in the Report.

Note C.

Abstract from Report of T. F. Bergin, Esq.

NOTE C.

Abstract from the Report of T. F. **Bergin,** Esq. relative to the working of the **Dublin** and **Kingstown Railway.**

The following analysis of the working may not be uninteresting to the Commissioners:—

There are three classes of coaches, viz.: First Class, One shilling. Second Class, close or open Eightpence. Third Class, Sixpence.

Subscriptions are received for First and Second Classes only, viz.: First Class, £14, yearly; £8 15*s.* half yearly; £1 15*s.* monthly. Second Class, £12, yearly; £7 10*s.* half yearly; £1 10*s.* monthly.

These are the rates for the whole distance; the intermediate stations are proportionally less, and there are several modified rates, as for ladies and boys' schools, &c.

The trains are despatched every half hour from each end of the line, from six or seven o'clock in the morning till half past 10 o'clock at night; and on Sundays and days of extra business, such as races, regattas, &c. every quarter of an hour.

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* We have given Mr. Booth's letter at length, in Appendix A, No. 9.

Note C.
Extract from Report of T. F. Bergin, Esq.

From the opening of the Railway on the 17th December, 1834, to the 1st March, 1836, a period of one year and 73 days, there were 31,890 single journeys by trains, each trip 5$\frac{2}{3}$ miles. The total number of passengers conveyed was, 1,237,800. For the first few months there was no precise record kept of the number of carriages in each train; but from the best information I can obtain, the average trains consisted of 1 first class, 2 second class, and 3 third class coaches, weighing, respectively, 59$\frac{1}{2}$ cwts., 65 cwts., and 53 cwts. Each engine and tender average together 15 tons; therefore the gross load moved 1 mile, was as follows:—viz.,

	Cwt.	qrs.	lbs.
6 coaches, weight, - - - - - - - -	348	2	0
Engine and tenders, - - - - - - - -	300	0	0
	648	2	0
Or,	32,425 tons		
Which, multiplied by number of trips, - - - - -	31,890		
	1,034,033.25		
And by the length of each journey, - - - - -	5$\frac{2}{3}$		

We have as the weight of coaches, engine, and tender, moved, 1 mile, 5,859,521 tons.
The passengers conveyed, amounted to, - - 1,237,800

Or, estimating 15 to the ton, to - - - 82,520 tons,
And multiplying by the length of each trip, - 5$\frac{2}{3}$ miles.

We have the load of Passengers moved 1 mile, - - - - 467,613 tons.

Or a gross load moved 1 mile, amounting to - - - - 6,327,134 „

That is, the load for which payment was received, amounted to little more than $\frac{1}{14}$th of the gross load moved.

The receipt per passenger, per mile, was 1.208 pence, and the cost of transit was as follows:

For locomotive power, - - -	·380 pence.
For wear and tear, &c., of coaches, -	·031 „
For wages, &c., of guards, police, &c. -	·113 „
For management and direction, - -	·078 „
For other miscellaneous expenses, -	·096 „
Per passenger per mile, -	·698 of a penny.

The average number of passengers per train was 38.8.
The capacity of the average trains was 139 persons.

During the six months from 1st March to 1st September, 1836, the working results were as follows:

Single journeys of 5$\frac{2}{3}$ miles, 13,331
Passengers conveyed 5$\frac{2}{3}$ miles, 687,848
Average coaches per train, 1 first class; 2·6 second class; 2·4 third class. Total, 6 coaches.
Average passengers per train, - 51
Capacity of average trains, - 148
Total cost of locomotive power, £4,680 11*s.* 8*d.*
Cost for locomotive power per passenger, per mile, .288 pence.

The preceding are little more than a transcript of my own private memoranda; and time will not admit of my giving the results of the last half year, or of reducing those I have given to the same terms, so as to admit of a strict comparison. I trust, however, that in their present crude form, these notes will not be altogether useless.

The remarkable disproportion between the average number of passengers per train, and the capacity of each train, requires some explanation. It arises from two causes, both of which I may say are almost incident to a short line of Railway, particularly, if, like this, it connects a large city with a favorite retreat, like Kingstown. In such a case the great bulk of the traffic necessarily consists in the conveyance of persons whose avocations lie in the city, but who reside in the country; these, generally speaking, will come to town every morning, and return in the afternoon; hence it follows, that the stream of business will be but in one direction at one time; and the trains must return very partially filled, sometimes almost empty. The same remark applies still more strongly to days of extra traffic, say a holyday, races, &c. Here, the concourse of persons desirous of proceeding to the point of attraction is frequently so great, that with all our efforts, and the ample supply of coaches, they cannot all be conveyed to the desired point, while the return trains are not figuratively, but literally almost empty.

I have seen trains of 14 or 15 carriages, which brought down nearly 400 individuals, return with only 6; and in more cases than one I have seen trains return absolutely empty. After the attractions of the day are over, the tide turns, and the up trains are filled, while those in the opposite direction are in their turn deserted.

The other cause to which I allude is the necessity of starting frequent trains at regular intervals, so short, that at the utmost, the whole amount of delay to an individual who may be late for one train and waits for the next, added to the time occupied by the journey, shall not exceed the time which would be occupied by some other conveyance, say, a Jaunting Car, in going the distance. If this be the case, the difference of personal comfort will generally turn the scale in favor of the Railway: in fact, a short line of Railway opposed by already long established public conveyances, must labor under considerable disadvantages in comparison with a long line, no matter how ample the competing conveyances may be; for the saving of time in the latter case is so great, that the travellers for business (and such will constitute the majority of Passengers on a line of 20 or 30 miles in length,) are well satisfied to adapt their movements to the starting of the trains, whence the managers of such a concern

Note C.
Extract from Report of T. F. Bergin, Esq.

are enabled to arrange the number of trains and the times of starting, with reference to the general current of intercourse, so as at all times to have a reasonably full load; besides the intervals between starting are so considerable, that there is ample time to make such changes in the number of Carriages as circumstances may require. On the contrary, with a short line, the saving of time is so comparatively trifling that the managers must suit the hours of starting to the convenience of the Passengers, who will not in general be disposed to wait half an hour in a Public Office or Waiting Room, when, by having recourse to the old conveyance, they may, within that time, have nearly reached their journey's end.

There is a third cause for the disproportion under consideration, consequent on the arrangements of this Company as to classification; namely, the necessity of having one coach, at least, of each class in each Train; whence we never can run less than three coaches; this is the usual train for morning and evening traffic; in illustration of this, I may state, that the average number of passengers per train from 6 o'clock in the morning till 8 is about 12; less, therefore, than could be accommodated by any one Coach, yet being of different classes we are obliged to run three. With respect to the distribution of business throughout the day, we find that from 6 to 8 o'clock in the morning the Passengers are very few in either direction; from half-past 8 till 11 or 12 a considerble number come from Kingstown to Dublin, but very few go out of town. At these hours the trains are increased to 5 or 6 Coaches, again, from 12 till about 3, or half-past 3, the number is comparatively small, and tolerably equal in each direction, rather more leaving Dublin than coming in. From half-past 3 till half-past 6 is the busiest part of the day, the Trade from Dublin to Kingstown being double or treble that in the opposite direction. Finally, from half-past 6 to the close of the stations at night, the number of Passengers is again small, averaging about 18 per train from Kingstown, and about double that number from Dublin.

With reference to the numbers conveyed on days of great business, we have occasionally sent off about 2000 persons within the hour for two or three hours in succession, by trains of 12 to 15 coaches despatched every quarter of an hour; but on Sundays, when the greatest amount of what may be designated regular traffic occurs, the usual course is for about four hours in the day to despatch a train every 15 minutes, containing about 250 persons, and the same at night from the other end of the line.

NOTE D.

Note D.
Absorbed and Effective Power of Locomotive.

INVESTIGATIONS RELATIVE TO MOTIVE POWER.

THE amount of the three former resistances referred to in the Report, depend in some measure upon the perfection of workmanship, and have been found to differ in different engines; but from the best information we have been able to collect, and upon which we conceive reliance may be placed, these several retarding forces may be taken at a medium as below, viz.:—

First, The friction of the engine gear, independently of any load, is equivalent to 6 lbs. per ton for the weight of the engine applied at the circumference of the wheel.

That is, supposing the engine to be raised from the ground, and a power applied to the circumference of the wheel, it would require an amount of force of 6 lb. per ton to cause the wheels to work the piston and engine gear, both sides of the piston being open to the atmosphere; therefore, conversely, when the pistons work the wheels, this same amount of steam power must be expended to put the gear in motion.

Secondly, The friction and resistance of the locomotive itself, independently of the engine gear, is 8 lbs. per ton applied to the circumference of the wheel.

That is, the engine gear being detached from the wheel, it will require a force of traction of 8 lbs. per ton to balance the resistance due to the friction of the axles, and to the retardation on the line of way.

Thirdly, The friction of the tender itself, including the increase of friction brought on the engine gear, is 9 lbs. per ton of its own weight.

Fourthly, The last resistance, *i. e.*, the atmospheric pressure on the piston, is necessarily 14.7 lbs. per square inch, or 11½ lbs. per circular inch on the area of both pistons. But this force being employed at the extremity of the piston rod, and being overcome only with the velocity of the piston, must be reduced according to the relative ratio of the velocities of the wheel and piston, which is different in different engines.[*] (See Pambour on Locomotive Engines.)

Before we can, therefore, exhibit numerically the amount of this retardation, it is necessary to state the dimensions of the several engines, which, after six years' experience, the Directors of the Liverpool and Manchester, and other Railway Companies, have found it expedient to adopt.

These are as below:—

Classes.	Cylinders, Diam. of.	Piston, Stroke of.	Wheel, Diam. of.	Engine, Weight of. Tons.	Tender, Weight of. Tons.
1	14 inches.	16 inches.	4 feet 6 inches.	12	6
2	12 "	16 "	5 " 0 "	12	6
3	11 "	18 "	5 " 0 "	8½	5½
4	11 "	16 "	5 " 0 "	8½	5½

In all these engines the pressure exhibited by the safety valve is 50 lbs. per square inch, and, therefore, the actual elastic power of the steam in the boiler is 50 lbs. added to 14.7 lbs. or 64.7 lbs. per square inch.

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[*] This ratio is that of the double stroke of the piston to the circumference of the driving wheels. It is a well known principle in mechanics, that when a force is transferred from one part of a system to another, the product of the pressure into the velocity is constant.

The product of the pressure of the piston into the velocity of the piston is equal to the product of the resulting pressure to the axle into the velocity of the axle, which is to the former velocity as the circumference of the wheel to the double stroke of the piston.

Note D.
Absorbed and Effective Power of Locomotive.

With these data the amount of absorbed power in these several cases is easily computed.

First Class—Friction of Engine gear, - - - -	6 × 12 =	72 lbs.
Do. Locomotive, - - - -	8 × 12 =	96 „
Do. Tender, - - - -	9 × 6 =	54 „
		222 lbs.
Area of both pistons, 307.8 square inches, at 14.7 lbs. per square inch. Reduced in the inverse proportion of the double stroke of the piston to the circumference of driving wheel, gives -		853 „
Absorbed power, -		1,075 lbs.

Now, on a good road, and with a well-made carriage, 1 lb. is generally estimated to draw 30 lbs. The power thus absorbed, therefore, in what may be termed the *preparation for motion*, with the first class locomotives, is sufficient to draw 32,250 lbs.; viz., more than fourteen tons on a good road by horse power. And again, on a canal with the usual barges, 1 lb. will draw, at 2½ miles per hour, 400 lbs. of useful load, viz., independently of the weight of the barges; this absorbed power would, therefore, draw 430,000 lbs. which is more than 190 tons.

In a similar manner, the amount of absorbed power in the three other classes is found as below :—

Second Class—Friction of Engine gear, - - - - - -	72 lbs.
Do. Locomotive, - - - - - -	96 „
Do. Tender, - - - - - -	54 „
Atmospheric pressure on 226.2 inches, at 14.7 lbs. reduced in the ratio 5.9 to 1, -	564 „
Absorbed power, -	786 lbs.

Third Class—Friction of Engine gear, - - - - - -	51 lbs.
Do. Locomotive, - - - - - -	68 „
Do. Tender, - - - - - -	49½ „
Atmospheric pressure on 190.06 inches reduced in the ratio of 5.23 to 1,	533½ „
Absorbed power, -	702 lbs.

Fourth Class—Friction of Engine gear, - - - - - -	51 lbs.
Do. Locomotive, - - - - - -	68 „
Do. Tender, - - - - - -	49½ „
Atmospheric pressure on 190.06 inches at 14.7 per inch, reduced as 5.9 to 1, -	471½ „
Absorbed power, -	640 lbs.

Now the whole power of these several engines is found by multiplying the area of their respective pistons by the pressure, (64.7 lbs.) and then reducing this product to the circumference of the wheel.

In this way it will be found that the

	Class 1st.	Class 2nd.	Class 3rd.	Class 4th.
Whole power is, - -	3.755	2.488	2.337	2.090
Absorbed power, - -	1.075	786	702	640

It thus appears that the absorbed power is nearly one-third of the whole power of the engine.

This absorption necessarily takes place, whether the whole power of the engine be required or not; and hence again is seen the advantage of large loads, that the engines may always have their full duty to perform.

Having found the whole amount of engine power, and the amount of absorbed power, it is easy to find the extreme load the engine is capable of drawing, the data for this determination being as follows:—

The mean force necessary to overcome the friction of the best constructed carriages and waggons on a level line, amounts to 8 lbs. per ton of the gross load, (that is, of the weight of the load and carriages inclusive,) and 1 lb. per ton additional of the said gross load, for the extra friction brought on the engine gear ; in all 9 lbs. per ton.

Hence, therefore,

	1st Class Engine.	2nd Class.	3rd Class.	4th Class.
Whole power, - -	3,755	2,488	2,337	2,090
Absorbed power, - -	1,075	786	702	640
	9) 2,680	9) 1,702	9) 1,639	9) 1440
	297 tons.	189 tons.	182 tons.	160 tons.

There is, however, another limit to the power of an engine, viz.—the adhesion between the wheels and the rails. The amount of which, according to a set of experiments on frictions by George Rennie, Esq., and published in the Philosophical Transactions for 1827, is about $\frac{10}{67}$ths of the pressing weight; so that assuming the weight on the driving wheels to be 6 tons, the greatest power of adhesion is 2,000 lbs., and the greatest load about 222 tons, such loads, however, are seldom applied except as a mere matter of experiment

Now, theoretically, the most advantageous load, as a matter of economy, would be the greatest practicable load the engine is capable of drawing, supposing the plane to be every where horizontal; but as the engines and trains generally have to ascend planes which require great additional force of traction, the load seldom amounts to so much as half the greatest load the engine is capable of drawing on a level; but taking every thing into account, it is still most economical to take the greatest load that, under all circumstances, is practicable. In the following Table 1, column 2, there is given the amount

P

Note D.
Absorbed and Effective Power of Locomotive.

of steam pressure requisite for different loads, from 10 tons to 290 tons, which is formed by simply adding to the absorbed power 9 lbs. per ton, and it thus appears that in the first class engine

A load of 10 tons requires - - - 1,075 + 90 = 1,165 lbs.
A load of 100 tons requires - - - 1,075 + 900 = 1,975 „

That is, ten times the load is drawn by considerably less than double the power: as the loads increase in weight towards 100 tons, which is assumed as the ordinary load, the unfavourable comparison in respect to the amount of fuel diminishes, and beyond that load the expenditure is less than in the medium case.

In order to exhibit the relation in this respect, in all practicable cases, the proportional amount of power per ton per mile, or for any distance, is computed and given in the fourth column of Table 1. The numbers are found thus:—the power required for 100 tons is 1,975 lbs. or 19.75 lbs. per ton, and for 10 tons 1,165 or 11.65 lbs. per ton, then denoting the former by unity—

$$19.75 : 11.65 :: 1 : 5.98$$

That is, the quantity of power per ton per mile with 10 tons, is very nearly six times as great as with 100 tons. In the same way all the other numbers in the fourth column are computed.

The third column exhibits the relative velocities attainable with different loads; these numbers are thus obtained. The second column exhibiting the constant piston pressure required, and the power of the engine or the supply of steam being supposed constant, the velocities will be inversely as these pressures; that is, the velocity with which steam can be produced of a power represented by 1,975, is to the velocity with a pressure 1,165, inversely as 1,975 : 1,165, or as $\frac{1}{1975} : \frac{1}{1165}$.

Therefore, calling the former velocity 1, the latter will be 1.70, or 10 tons will be carried with 1.$\frac{7}{10}$ times the speed of 100 tons. In a similar way all the numbers in the third column have been obtained.

At present we have only spoken of the excess of expenditure for fuel, but it will be seen that every expense is increased in a greater or less degree with small loads. The time of the engineer and assistants, for example, costs as much per hour with small loads as with great loads, and, therefore, if the time of the journey were the same, the expense per ton for wages would be ten times as great with 10 tons as with 100 tons, but the time is not the same; the expense per ton per mile, therefore, is directly as the time, and inversely as the load, or inversely as the load and velocity; representing, therefore again, the expense per ton for locomotive attendance for 100 tons by unity; the expense per ton for 10 tons is to that for 100, as $\frac{1}{10} \times 1.7$ to $\frac{1}{100} \times 1$, or as 100 to 1.7, or as 5.98 to 1. In this way the several numbers in the fifth column are computed.

Another important expense attending locomotive power is the wear and tear of the engine, and of the rails, chairs, &c.; but this item is not so easily reduced to numerical results as those considered above. It is not perhaps an unreasonable assumption, that an engine sustains as much or even more injury by passing a certain distance with a load of 10 tons, at the rate of 34 miles per hour, as with the load of 100 tons at the rate of 20 miles per hour, which would make the expense per ton per mile inversely as the load, and, therefore, the wear per ton ten times as great with 10 tons as with 100 tons. But if we take only the momentary wear and tear to be constant, we shall have as in the case of wages, the charges for this item per ton per mile, inversely proportional to the load and velocity, and, therefore, expressible by the same number as in the preceding cases: these are given in the sixth column. In a way similar to that which has been described for the formation of Table 1, for engines of the first class; Tables 2, 3, and 4 have been computed for the other class of engines, the only difference being, that in these the medium load is taken at 80 tons in the second and third class engines, and at 60 tons in the fourth instead of 100 tons.

TABLES showing the Steam Pressure required in the Cylinders for different Loads; the relative Velocity with those Loads; and the relative Expense of Haulage per Ton per Mile.

TABLE 1.—FIRST CLASS ENGINES.

Amount of Load.	Steam Pressure.	Relative Speed.	Steam power expended per Ton, per Mile.	Wages per Ton, per Mile.	Cost of Wear and Tear per Ton, per Mile.
No Load	1075	1.84			
10 Tons	1165	1.70	5.90	5.98	5.98
20 „	1255	1.57	3.17	3.17	3.17
30 „	1345	1.47	2.27	2.27	2.27
40 „	1435	1.37	1.82	1.82	1.82
50 „	1525	1.29	1.54	1.54	1.54
60 „	1615	1.22	1.36	1.36	1.36
70 „	1705	1.18	1.23	1.23	1.23
80 „	1795	1.10	1.13	1.13	1.13
90 „	1885	1.05	1.05	1.05	1.05
100 „	1975	1.00	1.00	1.00	1.00
110 „	2065	.95	.95	.95	.95
120 „	2155	.91	.91	.91	.91
130 ,	2245	.88	.87	.87	.87
140 „	2335	.84	.84	.84	.84
150 „	2425	.81	.82	.82	.82
160 „	2515	.78	.80	.80	.80
170 „	2605	.75	.77	.77	.77
180 „	2695	.73	.75	.75	.75
190 „	2785	.71	.74	.74	.74
200 „	2875	.69	.72	.72	.72
210 „	2965	.66	.71	.71	.71
220 „	3055	.64	.70	.70	.70
230 „	3145	.62	.69	.69	.69
240 „	3235	.61	.68	.68	68
250 „	3325	.59	.67	.67	.67
260 „	3415	.58	.66	.66	.66
270 „	3505	.56	.65	.65	.65
280 „	3595	.55	.64	.64	.64
290 „	3685	.54	.64	.64	.64

TABLE 2.—SECOND CLASS ENGINES.

Amount of Load.	Steam Pressure.	Relative Speed.	Steam power expended per Ton per Mile.	Wages per Ton per Mile.	Cost of Wear and Tear per Ton per Mile.
No Load	786	1.91			
10 Tons	876	1.74	4.60	4.60	4.60
20 „	966	1.55	3.48	3.48	3.48
30 „	1056	1.42	1.88	1.88	1.88
40 „	1146	1.31	1.52	1.52	1.52
50 „	1236	1.22	1.31	1.31	1.31
60 „	1326	1.13	1.18	1.18	1.18
70 „	1416	1.06	1.08	1.08	1.08
80 „	1506	1.00	1.00	1.00	1.00
90 „	1596	.94	.94	.94	.94
100 „	1686	.89	.90	.90	.90
110 „	1776	.85	.85	.85	85
120 „	1866	.81	.82	.82	82
130 „	1956	.77	.80	.80	.80
140 „	2046	.73	.78	.78	.78
150 „	2136	.70	.76	.76	.76
160 „	2226	.67	.74	.74	.74
170 „	2316	.64	.73	.73	.73
180 „	2406	.42	.72	.72	.72
190 „					

Note D.

TABLES showing the Steam Pressure required in the Cylinders for different Loads; the relative Velocity with those Loads; and the relative Expense of Haulage per Ton per Mile.

TABLE 3.—THIRD CLASS ENGINES.

Amount of Load.	Steam Pressure.	Relative Speed.	Steam power expended per Ton per Mile.	Wages per Ton per Mile.	Cost of Wear and Tear per Ton per Mile.
No Load	702	2.02			
10 Tons	792	1.79	4.46	4.46	4.46
20 „	882	1.61	2.48	2.48	2.48
30 „	972	1.46	1.82	1.82	1.82
40 „	1062	1.34	1.49	1.49	1.49
50 „	1152	1.23	1.29	1.29	1.29
60 „	1242	1.14	1.16	1.16	1.16
70 „	1332	1.06	1.07	1.07	1.07
80 „	1422	1.00	1.00	1.00	1.00
90 „	1512	.94	.95	.95	.95
100 „	1602	.89	.90	.90	.90
110 „	1692	.84	.86	.86	.86
120 „	1782	.79	.84	.84	.84
130 „	1872	.75	.81	.81	.81
140 „	1962	.72	.79	.79	.79
150 „	2052	.69	.77	.77	.77
160 „	2142	.66	.75	.75	.75
170 „	2232	.64	.74	.74	.74
180 „	2322	.65	.73	.73	.73

TABLE 4.—FOURTH CLASS ENGINES.

Amount of Load.	Steam Pressure.	Relative Speed.	Steam power expended per Ton per Mile	Wages per Ton per Mile.	Cost of Wear and Tear per Ton per Mile.
No Load	640	1.84			
10 Tons	730	1.61	3.73	3.73	3.73
20 „	820	1.44	2.08	2.08	2.08
30 „	910	1.29	1.55	1.55	1.55
40 „	1000	1.18	1.27	1.27	1.27
50 „	1090	1.08	1.11	1.11	1.11
60 „	1180	1.00	1.00	1.00	1.00
70 „	1270	.93	.93	.93	.94
80 „	1360	.87	.86	.86	.86
90 „	1450	.81	.83	.83	.83
100 „	1540	.76	.79	.79	.79
110 „	1630	.72	.76	.76	.76
120 „	1720	.68	.74	.74	.74
130 „	1810	.65	.71	.71	.71
140 „	1900	.62	.69	.69	.69
150 „	1990	.59	.68	.68	.68
160 „	2080	.56	.67	.67	.67
170 „	2170	.54	.65	.65	.65
180 „	2260	.52	.64	.64	.64

NOTE E.

Note E.
On Gradients.

ON THE EFFECT OF GRADIENTS.

It is difficult to illustrate and compute the effect of gradients generally, without entering on the subject mathematically, which it is desirable, if possible, to avoid.

A great deal of controversy has taken place in reference to the theoretical principles of this question; but the Commissioners, unwilling to embarrass the Report with controversial matter, have taken the best means in their power to ascertain the actual practical effects of the gradients on the lines at present in operation; and it is on these, and not on any particular theory, the following calculations are founded.

It is agreed on all sides, that the additional force requisite to urge a load up an inclined plane or gradient, is such a fraction of the gross load (that is, with engine and tender included) as expresses the slope of the plane, or the fraction of the height of the plane divided by its length.

The disputed point is, What is gained by the returning load descending the same plane? It has been maintained, that the power which is lost in causing a load to ascend a plane is gained by an equal returning load descending the plane; a deduction, however, which has been controverted by others. Without stopping here to discuss this question, the Commissioners will state the facts they have been able to collect on the subject, and which have been obtained by proposing the following queries to the engineers of the several present existing lines:—

1st. When a plane inclines so much as to give to the engine and load a tendency to acceleration, what is the greatest velocity it is deemed prudent to descend with, in comparison with the usual horizontal velocity? or, to specify more particularly, what velocity would it be deemed prudent to descend with on slopes of $\frac{1}{90}$, $\frac{1}{100}$, $\frac{1}{110}$, $\frac{1}{120}$, &c., supposing the horizontal velocity to be 25 miles per hour?

2nd. What is the greatest slope on which it is deemed prudent to allow of acceleration, and to what amount?

3rd. On medium slopes, what may be considered the excess of allowable descending velocities beyond the mean horizontal velocity?

The answers to these queries were not entirely accordant; but it would appear that no advantage can be claimed for descending planes of greater slope than $\frac{1}{140}$, and that the greatest allowable increase in the descending velocity on planes between $\frac{1}{140}$ and $\frac{1}{750}$ is one-fifth of the uniform horizontal velocity: on less slopes than $\frac{1}{750}$, the gain from descent varies from $\frac{1}{5}$th to nothing.

It appears, therefore, that whatever advantage may show itself theoretically on descending planes, there is no practical advantage for those of greater slope than $\frac{1}{140}$; and allowing an advantage of one-fifth additional velocity for planes of less slope than $\frac{1}{140}$, and greater than $\frac{1}{750}$, we are in general on the most favourable side.

It may be said that these descending velocities are obtained with less piston pressure, which is true; but the steam thus saved in the cylinders is commonly lost at the safety valve, so that there is little, if any saving of steam beyond what has been stated.

One or two cases may now be taken by way of illustration.

Let us suppose a load of 88 tons (tender included) to be drawn along a level plane at the rate of 20 miles per hour, and that this engine and train arrive at a rising plane, sloping 1 in 140; the engine being of the 1st class, viz., weight 12 tons, and tender 6 tons:

1st, It appears by Table 1, that the power absorbed is, ... 1075 lbs.
88 tons, at 9lbs. per ton, ... 792
1867 lbs.,

which is the pressure required on the horizontal plane.

Note E.
On Gradients.

To this is to be added the additional traction necessary to cause the loads to ascend the plane; we must now, therefore, add the weight of the engine itself, 12 tons; making the whole load to be raised 100 tons, or 224,000 lbs., and $\frac{1}{140}$th part of this is 1600 lbs. additional traction. But it has been seen that every 8 lbs. traction causes 1 lb. additional friction on the engine gear; this makes 1800 lbs.: the whole required force now therefore is 3667 lbs.; and the velocity being inversely as the pressure, or force of traction, we have 3667 : 1867 :: 20 : $10\frac{1}{5}$ miles, the velocity of ascent: that is, the time of ascending will be nearly double that required to go the same distance on a horizontal plane, but in the return the time of descent will be the same as on a horizontal plane; so that ascending and descending a plane of this slope with a load of 88 tons, will require the same time and power as would be necessary to pass and repass a horizontal plane of one-half greater length; or, calling the length of the gradient 1, the equivalent horizontal plane will be 1.5.

Taking now the same engine and load, and the slope of the plane $\frac{1}{500}$, let it be required to find the equivalent horizontal plane.

Here the absorbed power, as before, is, .. 1075
88 tons, at 9 lbs. 792

Traction on a level, ... 1867

Tons. Tons.
88 + 12 = 100 tons = 224,000 lbs.; this divided by 500 gives 448 lbs., which [is equivalent to the traction of 56 tons on a level; and this, at 9 lbs. per ton, is 504 additional pressure. The whole pressure is, therefore, 2371 lbs.; and 2371 : 1867 :: 20 : $15\frac{3}{4}$ miles nearly; and as 1867 :: 2371 :: 1 : 1.26 length of horizontal plane equivalent to the ascending plane. And again, $1\frac{1}{5}$: 1 :: 1 : .83 length of horizontal plane equivalent to the descending plane.

Whence, 1.20
.83

2.03

1.015 Mean equivalent plane.

It follows from this, that the lengths of the equivalent horizontal planes depend upon the amount of absorbed power of the engines, and the weights of the loads. In Tables 5 and 6 the length of equivalent horizontal planes are computed for gross loads of 100 tons and 50 tons, with engines agreeing in dimensions with what have been denominated the 1st class engines, and Tables 7 and 8, &c., for the same loads with engines of the 2nd, 3rd, and 4th class.

TABLES showing the Lengths of HORIZONTAL LINES equivalent to the several Ascending and Descending PLANES stated in Column 1; the length of the Plane being unity.

TABLE 5.—FIRST CLASS ENGINES
Gross Load, i. e. including Engine and Tender, 100 tons.

Gradients or Planes.	Equivalent Horizontal Lines.		
	Ascending.	Descending.	Mean of the two.
1 in 90	2.50	1.00	1.75
95	2.42	1.00	1.71
100	2.39	1.00	1.69
110	2.23	1.00	1.61
120	2.12	1.00	1.56
130	2.04	1.00	1.52
140	1.96	1.00	1.46
160	1.84	.83	1.33
180	1.79	.83	1.31
200	1.67	.83	1.25
250	1.53	.83	1.18
300	1.45	.83	1.14
350	1.38	.83	1.10
400	1.33	.83	1.08
500	1.27	.83	1.05
750	1.18	.83	1.01
1000	1.13	.85	1.00
1000	1.09	.90	1.00

TABLE 6.—FIRST CLASS ENGINES.
Gross Load, i. e. including Engine and Tender, 50 tons.

Gradients or Planes.	Equivalent Horizontal Lines.		
	Ascending.	Descending.	Mean of the two.
1 in 90	1.99	1.00	1.49
95	1.94	1.00	1.47
100	1.89	1.00	1.44
110	1.81	1.00	1.40
120	1.74	1.00	1.37
130	1.68	1.00	1.34
140	1.64	1.00	1.32
160	1.56	.83	1.20
180	1.49	.83	1.16
200	1.44	.83	1.13
250	1.36	.83	1.09
300	1.30	.83	1.06
350	1.25	.83	1.04
400	1.22	.83	1.02
500	1.18	.83	1.01
750	1.12	.88	1.00
1000	1.09	.91	1.00
1500	1.06	.94	1.00

Note E.
On Gradients.

TABLES showing the length of horizontal lines equivalent to the several Ascending and Descending PLANES in Column 1; the length of the Plane being unity.

TABLE 7.—SECOND CLASS ENGINES.
Gross Load, i. e. including Engine and Tender, 80 tons.

Gradients or Planes.	Equivalent Horizontal Lines.		
	Ascending.	Descending.	Mean of the two.
1 in 90	2.60	1.00	1.80
95	2.51	1.00	1.75
100	2.44	1.00	1.72
110	2.38	1.00	1.69
120	2.20	1.00	1.60
130	2.10	1.00	1.55
140	2.03	1.00	1.51
160	1.90	.83	1.36
180	1.80	.83	1.31
200	1.72	.83	1.27
250	1.58	.83	1.20
300	1.48	.83	1.15
350	1.41	.83	1 12
400	1.36	.83	1.09
500	1.28	.83	1.05
750	1.19	.83	1.01
1000	1.14	.86	1.00
1500	1.09	.91	1.00

TABLE 8.—SECOND CLASS ENGINES.
Gross Load, i. e. including Engine and Tender, 40 tons.

Gradients or Planes.	Equivalent Horizontal Lines.		
	Ascending.	Descending.	Mean of the two.
1 in 90	2.07	1.00	1.53
95	2.02	1.00	1.51
100	1.97	1.00	1.48
110	1.88	1.00	1.44
120	1.80	1.00	1.40
130	1.74	1.00	1.37
140	1.69	1.00	1.34
160	1.60	.83	1.21
180	1.53	.83	1.18
200	1.48	.83	1.15
250	1.42	.83	1.12
300	1.32	.83	1.07
350	1.27	.83	1.05
400	1.24	.83	1.03
500	1.19	.83	1.01
750	1.19	.88	1.00
1000	1.09	.91	1.00
1500	1.06	.94	1.00

TABLE 9.—THIRD CLASS ENGINES.
Gross Load, i. e. including Engine and Tender, 80 tons.

Gradients or Planes.	Equivalent Horizontal Lines.		
	Ascending.	Descending.	Mean of the two.
1 in 90	2.66	1.00	1.83
95	2.58	1.00	1.79
100	2.50	1.00	1.75
110	2.36	1.00	1.68
120	2 25	1.00	1.62
130	2.15	1.00	1.57
140	2.07	1.00	1.53
160	1.94	.83	1.43
180	1.83	.83	1.33
200	1.75	.83	1.29
250	1.60	.83	1.21
300	1.50	.83	1.16
350	1.43	.83	1.13
400	1.37	.83	1.10
500	1.30	.83	1.06
750	1.20	.83	1.01
1000	1.15	.85	1.00
1500	1.10	.90	1.00

TABLE 10.—THIRD CLASS ENGINES.
Gross Load, i. e. including Engine and Tender, 40 tons.

Gradients or Planes.	Equivalent Horizontal Lines.		
	Ascending	Descending.	Mean of the two.
1 in 90	2.14	1.00	1.57
95	2.08	1.00	1.54
100	2.02	1.00	1.51
110	1.93	1.00	1.46
120	1.85	1.00	1.42
130	1.78	1.00	1.39
140	1.73	1.00	1.36
160	1.64	.83	1.23
180	1.57	.83	1.20
200	1.52	.83	1.17
250	1.41	.83	1.12
300	1.34	.83	1.08
350	1.29	.83	1.06
400	1.25	.83	1.04
500	1.20	.83	1.01
750	1.13	.87	1.00
1000	1.10	.90	1.00
1500	1.07	.93	1.00

TABLE 11.—FOURTH CLASS ENGINES.
Gross Load, i. e. including Engine and Tender, 60 tons.

Gradients or Planes.	Equivalent Horizontal Lines.		
	Ascending.	Descending.	Mean of the two.
1 in 90	2.51	1.00	1.75
95	2.44	1.00	1.72
100	2.36	1.00	1.68
110	2.33	1.00	1.66
120	2.14	1.00	1.57
130	2.05	1.00	1.52
140	1.97	1.00	1.48
160	1.85	.83	1.34
180	1.75	.83	1.29
200	1.68	.83	1.25
250	1.54	.83	1.18
300	1.45	.83	1.14
350	1.39	.83	1.11
400	1.34	.83	1.08
500	1.23	.83	1.03
750	1.18	.83	1.01
1000	1.13	.87	1.00
1500	1.09	.91	1.00

TABLE 12.—FOURTH CLASS ENGINES.
Gross Load, i. e. including Engine and Tender, 30 tons.

Gradients or Planes.	Equivalent Horizontal Lines.		
	Ascending.	Descending.	Mean of the two.
1 in 90	2.00	1.00	1.50
95	1.95	1.00	1.47
100	1.90	1.00	1.45
110	1.82	1.00	1.41
120	1.75	1.00	1.37
130	1.69	1.00	1.34
140	1.64	1.00	1.32
160	1.56	.83	1.20
180	1.50	.83	1.16
200	1.45	.83	1.14
250	1.35	.83	1.09
300	1.30	.83	1.06
350	1.26	.83	1.04
400	1.22	.83	1.02
500	1.18	.83	1.01
750	1.12	.88	1.00
1000	1.09	.91	1.00
1500	1.06	.94	1.00

Note E.
On Gradients.

These tables will furnish criterea for determining the effects which different orders of gradients have upon the working of a line of Railway, the load being given; for, by reducing every length of gradient to its equivalent horizontal plane, it will be seen what length of horizontal plane is equivalent to the whole line.

It is to be observed, however, that the effect thus shown is not all the effect that is due to the gradients and planes; for it is these planes which limit the amount of load. If a line is wholly horizontal, and the traffic abundant, the loads may be chosen so as to bring out the best effect; and it has been seen, that the greater the load within the power of the engine, the greater the economy of working; but when it is required to ascend planes without assistant power, the load must be taken such, that it will ascend the plane with a certain velocity.

The engines are thus obliged to work with small loads, and all the loss attending on such loads must be considered to increase to the above disadvantages.

Thus, for example, in ascending a plane of 1 in 140, with a load of 100 tons, it appears by Table 5, that the force of traction would be doubled, or be equivalent to the traction of 200 tons on a level. In order, therefore, that the engine may ascend this plane without assisting power, it would be deemed necessary to reduce the load, probably to 60 tons; and then again, by referring to Table 1, it appears that all the expenses of haulage are increased 36 per cent.; not only, therefore, is the equivalent horizontal plane about one-half longer than the real length of the actual plane, but the expense of working the whole distance is increased 36 per cent.

This points out the advantage of accumulating the ascents as much as possible into short steep planes, and working these planes by assistant engines either motive or stationary: for although there is really no saving of power by this arrangement, there is a saving of time; and what is of more importance, it will not be necessary to reduce the amount of the loads below what would be otherwise considered as most advantageous for the general traffic. These remarks apply to all kinds of loads; but they refer more particularly to those of heavy luggage, where speed is not so essential a consideration as in the passenger trains.

NOTE F.

EXPERIMENTS ON STEAM VESSELS.

Note F
Experiments on Steam Vessels.

LETTER from Mr. BARLOW to SIR JOHN BARROW, Bart.

Woolwich, 7th November, 1836.

SIR,—I beg to inform you, that, agreeably to the permission given me by my Lords Commissioners, I this day, with Mr. Ewart, made the experiment suggested in my former letter, on the Echo steamer; there being on board 48 tons of coals, and stores for Channel service.

We found the pressure of the steam in the boiler by the steam guage, 4 pounds per inch, and by the usual trial ascertained the mean speed per hour to be 8.42 miles.

The steam was then, as suggested by me, reduced to 1½ pounds per square inch, as shown by the same guage, and the mean speed, found as before, was 8.46 miles per hour.

The result is certainly extraordinary. I anticipated a reduction of speed, but less in proportion than the reduction of fuel. We found, however, no change of speed, or if any, in favour of the lower pressure. Every thing was satisfactorily conducted. The time was taken by two persons independently, and Mr. Ewart attended to the steam guage and the management of the fire.

Although we could not tell the exact difference in the quantity of fuel consumed in the two cases, it was obviously much less, as indeed it ought to be, seeing that the quantity of steam used was nearly 20 per cent. less.

The experiment is therefore well deserving of attention, and as it may be repeated with only about an hour and a half additional time whenever the usual experiments on the speed of the vessels are made, I have reason to hope, that their Lordships will give directions to that effect, and I shall in that case feel myself much obliged by being furnished with the results.

I have the honor to be, Sir, your obedient servant,

To Sir John Barrow, Bart. (Signed,) PETER BARLOW.

SUBSEQUENT EXPERIMENTS on H.M. Steam Vessel LIGHTNING, between Woolwich and the Nore, with Massey's Patent Logs.

Time of heaving the Log.	Larboard Log.	Midship Log.	Starboard Log.	Mean No. of Strokes.	Steam Guage.	Vacuum.	MeanSpeed
H. M. S.	Miles.	Miles.	Miles.		lbs.	Inches.	Miles.
9 8 56	0.00	..	0.00	24½	3¼	27	8.26
10 8 56	.90	..	8.34				
10 45 0	0.00	..	0.00	23	1	27½	8.04
11 45 0	8.03	..	8.05				
11 53 0	0.00	0.00	0.00	23	1	27½	7.52
12 53 0	7.44	7.42	7.63				
1 4 0	0.00	0.00	0.00	24½	3¼	27	7.91
2 4 0	7.92	7.91	7.90				

Note F.
Experiments on Steam Vessels.

The two first experiments were with the wind, the other two head to wind.

Mean of the two speeds, full pressure, - - -	8.08 miles.
Do. do. light pressure, - - -	7.78 „
Difference, - - - - - -	.30

14¾ lbs. atmosphere, 14¾
3¼ 1
18 15¾
24½ No. of strokes, 23
441 Relative power, 362¼ difference, 79.
441 :: 79 : 100 : 18,

Showing a reduction of steam power of 18 per cent. with a reduced speed of only 3.7 per cent.

(Signed,) PETER BARLOW.

COPY of a LETTER from MR. BARLOW to CHARLES WOOD, Esq., M. P.

Woolwich, 2nd March, 1837.

SIR,—In compliance with the request of Sir Charles Adam, I beg to forward a concise abstract of my experiments on H.M. Steam Vessels, Echo and Lightning, and the conclusion I draw from them, although, perhaps, they require to be confirmed by one or two other experiments.

It is well known that the resistance of water to a body moving in it increases much more rapidly than in the proportion of the velocity, and therefore, that the quantity of fuel requisite to increase the speed from any given velocity, as, for example, from 9 miles to 9½ miles, would be much greater than in the latter proportion; in fact, that by being content with the former speed, the same fuel would, in some cases, carry the vessel, 100 or 200 miles farther than with the latter.

This was my theoretical view of the subject, and by permission of the Lords Commissioners, I put it to the test of experiment in the two vessels above named, and the result was, that by reducing the power, and therefore the expenditure of fuel, one-sixth, the speed was reduced only one-twenty-fourth, and this result is in a great measure confirmed by the prior experiments of Captain Oliver on H.M. steamer Dee.

I consider, therefore, that it would be desirable that the Captains in command of H.M. steam vessels should be made acquainted with the fact, and that they should be recommended, when their vessels are employed on services which do not require the greatest speed, (at all cost,) and when wind and weather are favorable, to work with their steam guage at not more than 1 lb. above the atmosphere. This may be done by allowing their fire to act with less energy, without requiring any other change, and the full power will be always at command, if any circumstance should require it.

There can, I think, be no doubt, that this practice, in such cases as I have supposed, would allow the same distance to be run at 9 miles per hour, with ⅙th less fuel than if the speed were forced all the voyage to 9⅓ or 9½ miles per hour.

I have the honor to be, Sir, your obedient servant,

(Signed,) PETER BARLOW.

To Charles Wood, Esq., M. P. &c.

NOTE G.

Note G.
Particulars and Capabilities of H.M. Steam Sloop Medea.

PARTICULARS relative to H. M. Steam Sloop MEDEA; accompanied with some Practical Remarks and Suggestions respecting Steam Vessels in general, by HORATIO T. AUSTEN, Esq., Commander; addressed to the Lords Commissioners of the Admiralty, 1835.

PARTICULARS AND CAPABILITIES OF H. M. STEAM SLOOP MEDEA, AND HER CLASS OF STEAMERS.

The Medea was constructed by Oliver Lang, Esq.

	Feet.	In.
Length, extreme, - - - - - -	206	0
Length between the perpendiculars, - -	179	4½
Keel for tonnage, - - - - - -	157	0½
Breadth, extreme over paddle boxes, - -	46	0
Breadth inside, - - - - - -	31	11
Breadth, including sponsons, - - - -	42	0
Depth of hold, - - - - - -	21	0
Burthen in tons, - - - - 835 tons.		

		Feet.	In.
Draught of water, with 200 tons of Coals, 32 pounder, 15 tons of water, and stores for channel service,	Aft,	13	6
	Forward,	13	3
	By stern,	0	3

Note G.

Particulars and Capabilities of H.M. Steam Sloop Medea.

		Feet.	In.
Draught of water, with 300 tons of Coals, (of which 264 tons are stowed in the boxes, and 36 tons in bags, in the orlops and engine-room, with 20 or 30 bags on deck, and 10-inch guns, 18 tons of water, 10 weeks' provision, and stores for foreign service,	Aft,	14	6
	Forward,	13	10
By stern,		0	8

	Feet.	In.
Length of engine-room, including boilers,	61	9
Breadth, exclusive of coal boxes,	22	0
Depth of engine-room,	21	0

The engines, boilers, and coal boxes occupy 795.27 cubic feet, or nearly one-half the contents of the ship.

Total weight connected with the above, - - - 600 tons.

Of the Engines.

OF THE ENGINES.—Maker of Engines, Messrs. Maudsleys and Field. Power, 220 horses; diameter of cylinder, 4 feet 6 inches; length of stroke, 5 feet; weight of engines, 114 tons each.

Of the Boilers.

OF THE BOILERS.—The boilers are four in number, two of which are connected together at their ends. The front pair have one steam chest, for the reception of the steam produced by the whole; each pair of boilers can be employed separately. They contain, in the whole, 45 tons of water, and are filled and emptied by pipes, passing through the ship's bottom; and by the application of vacuum pumps they are filled in from 15 to 20 minutes.

Height of boilers above water line, 2 feet 6 inches; of steam chest above water line, 7 feet. Weight of boilers, about 35 tons.

Of the Wheels.

OF THE WHEELS.—Maker of wheels, William Morgan, Esq. These work with an eccentric action in the float, doing away, in a great measure, with the vibration and irregular undulation; as also rendering a varied draught of much less importance, and in a sea-way considerable velocity is gained. It is also considered, that when disconnected, and the vessel put under sail, they offer very much less resistance than the common wheel. Those first fitted to the Medea, have proved too weak for a vessel of her capacity.

	Morgan's Wheel, Medea.		Common Wheel, Salamander.	
	Feet.	In.	Feet.	In.
Diameter,	24	6	21	0
Length of paddle boards,	5	7½	8	9
Breadth of ditto,	4	6	2	6
Area of ditto,	18.75	0	22	0
Dip or immersion of ditto, for channel service,	6	4	3	8
Ditto complete for foreign service, with 10-inch guns,	6	9½	5	0
Weight of wheel,	not known.		not known.	

Steaming Capabilities

STEAMING CAPABILITIES.—Under the most unfavorable circumstances the steam can be raised from cold water, in one hour and 40 minutes; it has been accomplished with the thermometer at 67° in one hour and 30 minutes.

The quantity of coals usually required for this purpose, is from 36 to 40 bushels.

Firewood, 14 feet; the expense of which is about £1 7*s.*

The quantity of coals which the Medea carries, is considered equal to 19 days; and the other necessary stores for a much longer period; which, at the rate of 8 miles per hour, at the expense of 1*s.* 5½*d.* per mile, or £13 19*s.* per day, would carry her 3,648 miles. Total expense, £260 1*s.*

The steam having been once raised, she could be got ready to proceed on any service, in from 10 to 15 minutes, by keeping four fires banked up, which can be done at the expense of from 3 to 4 bushels of coal per hour, value about 2*s.* 8*d.*

When required to keep up a rate of speed less than the capability of engines, but more than that of the sails, it can be accomplished, by working, alternately, one engine and one set of boilers, with three fires.

The result of keeping our station with the Squadron, while making a passage of 10 days, from Vourla Bay to Malta, under these circumstances, was, that we expended 20 tons of coals, costing about £2 16*s.* per day, or 6½*d.* per mile.

The Medea can tow a line-of-battle ship, in a calm, about 6 knots an hour, at an average expense of £3 10*s.* for 4 hours.

A squadron, consisting of 5 line of battle ships was towed out of Malta harbour, on the 8th of February, 1835, in 4 hours 20 minutes, at the expense of £3 6*s.*

Her rate of steaming in a calm, with 200 tons of coals on board, and stores for channel service, 9¼ knots per hour, with 300 tons of coals, 10-inch guns, and stores for foreign service, 8½ knots. Head to wind, in a double reef top sail breeze, 6½ knots. In a gale, the wind being sufficiently on the bow to allow the main trysail to stand, it was found necessary to ease the engines to half speed, when the vessel was extremely dry, shipping nothing but sprays, and averaged from 1 to 2 miles per hour, about 2 points to leeward of her course; thereby showing the capability of steam vessels clearing a lee shore, when a sailing craft in all probability would not do so.

This class of vessel is enabled to work one wheel and one engine; both wheels with one engine; or, one wheel with both engines. It was found, that when working with one wheel, a very slight inclination of the helm was required to counteract it. We have turned a complete circle in 5 minutes and 5 seconds, the diameter of which was 174 fathoms.

Note G.
Particulars and Capabilities of H.M. Steam Sloop, Medea.

To work the engines for 24 hours, the following consumable stores have been found sufficient:

	£	s.	d.
Coals, 17 tons, about 8 lbs. per horse power, per hour, value	13	9	2
Oil, 3 gallons,	0	15	0
Tallow, 30 lbs.	0	10	0
Oakum, 3 lbs.	0	0	7½
	£14	14	9½

While performing her duties in the channel, the average expense, per mile, appears to be about 2*s.* 6*d.*, having so frequently to get the steam up for running short distances.

To clean the engines after working, it requires 4 pints of oil, 8 lbs. of oakum, and 2 bath bricks, the value of which is 4*s.* 8*d.*

To keep them in order while lying quiet in harbour, the average expense for both summer and winter has been found to be 14*s.* per week.

Up to this period, no repairs have been required for the engines or boilers. When the engines are at work, 4 tons of good water are distilled every 24 hours.

Sailing Qualities.

Sailing Qualities.—When under sail alone, the wheels are disconnected from the engines; this operation can be accomplished in any weather in 20 minutes. It is but justice to remark, that had these vessels been supplied with any other than Maudsley's engines, the process of connecting and disconnecting would have been extremely tedious.

But it is recommended, that when a steam vessel has to proceed a considerable distance previous to the probability of employing the steam, the lower half of the wheels, with the boards, be removed; the wheels remaining connected, for the purpose of preventing the wear and tear of them from the unnecessary revolutions and irregular action of the sea.

Rate, when on a wind in a strong single-reefed topsail breeze and smooth water, 8 knots; in a moderate quarterly gale, 11½ knots.

Her tacking may be depended upon in strong breezes, in a sea way, fully equal to a sailing vessel of war, and in light winds when she has steerage way.

In treble-reefed topsail breezes, while cruizing with the squadron, we have been found to weather considerably upon them; showing the advantages of the great quantity of canvass spread in fore and aft sails; it only, therefore, becomes necessary that these sails, and the spars attached to them, should be strong in all their proportions; but in moderate and light winds, when the squadron carry sail, they beat us on an average about one mile per hour. With the present proportions of rigging, canvass, &c., we are extremely stiff, dry, and easy, and in every way manageable; but some of the present spars are rather too slight for fresh breezes; consequently, the result of the Medea, as a sailing vessel, may be considered as little inferior to a dull sailing vessel of war; and perhaps, in getting off a lee shore, while blowing hard, has not more to apprehend than any other sailing vessel. She could well conduct a convoy, keep her station while cruizing off any port, and could make a passage to any part of the world under sail alone.

Remarks.

Remarks.—After a week's steaming it becomes important that the boilers should be thoroughly blown out, also that the flues should be swept, if possible. The former can be easily effected at sea, in the space of two hours; but the whole operation of sweeping the flues, filling the boilers with fresh water, and adjusting the engines, would require from 36 to 48 hours. The blowing off cannot be too frequently done, because, if strictly attended to, I am confident, neither a chipping chissel nor hammer need be applied to the interior of the boilers. There has been taken from the Medea's flues, after a week's steaming, sixty bushels of soot; it has been proved, that too much attention cannot be paid to the keeping of a steamer's bilge clean; for even with the greatest care, certain portions of mercury have been floating there, together with oil, tallow, and cinders, sufficient to choke the pumps.

A great saving might be effected if cruizing steamers were ordered, when returning after the execution of their service, with a leading wind, to employ only one engine.

Directions for Firing.

Directions for Firing.—This operation is to be performed with all possible expedition, and in general only two shovels full of coals, but never more than three are to be put on the fire at any one time; each shovel full must be thoroughly scattered over the whole surface of the fires, and as soon as the coals have been thrown on, the furnace doors are to be instantly, but *gently* and *completely* closed.

The coals put on should not exceed two square inches in size.

The fires are to be kept at such a distance from the doors as to allow the upper and outer edges of the bars being visible when they are opened.

The steam should be prevented from blowing off in any quantity from the steam pipe head; to prevent which, however, the furnace doors are never to be opened.

For the purpose of preventing the flame from acting so intensely upon the sides of the fire places, which causes them frequently to blister; the fire bar next to the side should not be disturbed by the prizing lever or rake when clearing them; the surface of the fires should be rounded, that is, they should be kept high in the centre, and gradually decreasing towards the sides.

One of the fires is to undergo the operation of cleaning and cleansing during each watch, which must be carefully and gently performed.

As many cinders as practicable are at all times to be reburnt, and much care is to be taken in registering the quantity of coals expended.

The Medea having returned to England since the above was written, we have obtained from Captain Austen the following abstract from his logs, for the present year, 1837:—

ABSTRACT showing the Average Number of Revolutions per Minute, Consumption of Stores and their Value, as supplied, the Rate per Hour, and Expense per Mile, during the passage of H.M. Steam Vessel of War, MEDEA, from March to August, 1837.

Date.	No. of Hours Steaming.	Distance run, in Nautical Miles.	Average			Expended while actually Steaming.				Total Expense.	Total No. of Revolutions.	Winds.	Remarks.
			No. of Revolutions per Minute.	Rate per Hour.	Expense per Mile.	Coals, in Tons.	Oil, in Gallons.	Tallow, in lbs.	Oakum, in lbs.				
				Miles	s. d.					£ s. d.			
From March 20 to 25	97	715	17½	7⅓	2 5¼	73½	12	140	20	87 9 10	95,550	N.Westerly; N.Easterly.	Sails available part of the time.
– 28 to 31	70	610	18½	8¾	2 6¾	62	9½	110	10	78 11 7	77,845	N.W.; Southerly.	Ditto; Coals very inferior.
– April 1 to 5	93	686	16½	7⅓	3 0½	83½	12	130	15	105 5 9½	94,340	S.W.; S.E.; N.W.	Coals very bad; Sails available part of the time; great difficulty in keeping Steam.
– – 13 to 16	84	700	18½	8⅓	3 6¼	99	10	142	10	123 11 0	96,247	S.W.; S.E.; N.W.	Coal much worse, being near the bottom of coal-boxes.
– June 18 to 22	100	710	16⅔	7 1/10	3 0¾	85½	16	80	16	108 11 10	100,000	Northerly; N.Westerly.	Sails available for a few hours only.
– June 27 to July 1	93	855	20	9¼	2 8½	92	15	100	20	116 14 3	114,900	Northerly.	Sails available part of time only.
– July 15 to 21	116	1000	19	8⅝	2 8	107	15	150	20	134 16 3	134,740	N.; N.N.W., E.; S.E.	Light and moderate breezes; Sails available.
– – 21 to 24	66	550	18	8⅓	2 1½	46	9½	92	10	59 0 0	68,740	E.; E.S.E.; S.E.	Light breezes; Sails available part of time only.
– Aug. 2 to 5	64	550	18⅔	8½	2 1¾	46	9	90	10	58 18 0	70,916	S.S.E.; W.S.W.; N.N.W.	Ditto; ditto for a short time only.
– – 10 to 13	64	550	18¾	8¾	2 2½	48	9	90	10	60 18 8	71,500	N.; S.E.	—
– – 15 to 17	30¾	290	17¾	9½	2 1¼	23½	6	60	8	30 15 2½	32,109	Calm.	Calm and fine.
– – 18 to 21	60	530	19	8¾	2 2½	45	9	90	15	57 15 9¼	70,785	Southerly.	Sails available.
	938	7744											

Whole distance steamed, 7,744 nautical miles. Mean speed, 8¼ knots per hour.

The average consumption of Coal per horse power per hour is, according to this abstract, 8.8 lbs.; but it will be remarked that they were generally of very inferior quality.

NOTE H.

Note H.
Dimensions and other Particulars of the new Steam Ship British Queen.

LETTER addressed to PETER BARLOW, Esq.

London, 78, Cornhill, June 20th, 1837.

SIR,—In reply to your inquiry relative to the steam ship "Victoria,"* constructing by Messrs. Curling, Young, and Co., for the British and American Steam Navigation Company, and intended to trade between London and New York, calling at Cork, upon her outward voyage, I beg to state that her dimensions are as follows:

		Feet.	In.
Length between perpendiculars,	- - -	237	0
Extreme Beam,	- - - - - -	40	4
Depth in Hold,	- - - - - -	27	1

Admeasurement in Tons, 1825, (old law.) She is flush decked, and has three tier of deck beams and fastenings. The floor timbers are solid for 140 feet amidships, and she is filled up solid and caulked between the timbers as far as the lower deck, or to the 13 foot water line; her draught of water I expect to be at her deepest immersion, 16 feet, and her displacement at that draught is 2,740 tons.

Her engines are of the nominal power of 400 horses, having cylinders of 76 inches in diameter, and 7 feet length of stroke. Her paddle-wheels will be 30 feet in diameter, and are intended to be fitted with the divided floats. At her deepest immersion it is intended to remove the outer float, thereby reducing the wheel to 29 feet, or even less. When she has lightened, the float will be replaced upon the outer periphery. The engines will have the means of using either the common injection or Hall's patent condenser.

Of course in an undertaking of this magnitude, no common responsibility is thrown upon those who are entrusted with the planning and modelling of the vessel and engines. I am alone answerable for the vessel as to workmanship and model; but with regard to the engines, I do not consider myself responsible, except so far as the proportion of tonnage, or rather displacement to power; whether I have been correct in my calculations remains to be proved: but to show that I have made ample allowance for the weights necessary, I may here give what I expect will be the total weight with her fuel on board:—

Hull and Copper Sheathing,	- - - - -	1000 Tons.
Spars, Sails, Anchors, Cables, and 1200 gallons of Water,	-	250 „
Engines, Boilers, and Water,	- - - -	450 „
Coals,	- - - - - - -	750 „
		2450 „
Passengers, Cargo, and Sundries,	- - - -	250 „
Total Weight on leaving Port,	- - - -	2700 „

Allow me now to remark that I think it very likely that the "Victoria" will be the largest steam vessel that will be built of wood. I have been long of opinion that iron will supersede all wooden steam vessels, and have made some calculations on the subject which may prove interesting to the Commissioners.

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* This vessel has now been built and launched under the title of the British Queen.

Note H.

Dimensions and other particulars of the new Steam Ship British Queen.

The advantages of iron over wooden vessels may be briefly stated to be :

Superior strength with one half the weight, consequently less displacement, and a greater speed with equal power.

Greater safety, in consequence of being divided with water tight compartments by iron bulk heads.

Greater economy, as they require less repairs.

Greater capacity for passengers and goods. A wooden vessel of 30 feet beam, is only 27 feet 6 inches wide inside; while an iron vessel would be 29 feet 6 inches, consequently saving two feet in the whole length of the vessel :

When in Liverpool, you can satisfy yourself whether these statements are correct.

I think for the American trade an iron vessel of the following dimensions could be made to go at a medium, 10 miles per hour.

Length, - - - - - -	212 feet.
Beam, - - - - - -	33 „
Depth, - - - - - -	15 „

With Engines of 300 horse power.

Her weight, exclusive of engines, would be about 260 tons, and a wooden vessel of similar dimensions would not be got under 600 tons, if even with that, and certainly not with equal strength. Now supposing with her machinery and coals on board she drew 9 feet water, her sectional area would not exceed 250 feet, and her power being 300 horses, it is but fair to suppose her speed to approximate to 12 knots in smooth water, or that she would average 10 knots; if so, she would make the passage of 3000 miles in 12½ days and consume only 300 tons of coals, allowing one ton per horse. The cost of this vessel, complete, with her engines and fittings, would be less than the cost of the hull of the "Victoria;" in other words, the latter will cost £60,000, and the iron one, to do the same work in less time, would cost about £30,000. In fact, for the cost of one vessel, making six voyages annually, you would have two making twelve.

I have mentioned this to you, as there exists no difficulty, but in local attraction, in thus diminishing the expense of transatlantic steam navigation, and consequently increasing the power and resources of this country to an indefinite extent. Their introduction would virtually insure us the monopoly of the trade. We cannot compete with the Americans in wood: they cannot compete with us in metal; and though these speculations may now appear visionary, I am convinced, when you have examined the vessels now upon the stocks in Liverpool, you will agree with me in thinking, that the time is fast approaching when wooden steamers will be the exception, and iron ones the rule.

I remain, yours most respectfully,

To P. Barlow, Esq. (Signed) Maccgregor Laird.

NOTE I.

Note I.

Hourly consumption of Coals in the Thetis.

An Account of the Quantity of Coal consumed in H.M. Packet Thetis, distinguishing the Quantity actually burnt during the Passage, from that employed prior and subsequent thereto. In a Letter from Lieutenant Townley, R. N., to Captain Chappel, R. N.

Thetis—160 Horse Power, 390 Tons. —New Rule.

Sir,—In obedience to your instructions of this day's date, I beg leave to transmit herewith an account of the consumption of coals per hour, from the date of the order to keep such a record, until the 18th instant, when it was the Thetis' turn to be laid up.

I have taken much pains in keeping this account, which includes the whole consumption of coal from the time the fires are lit, until the steam is down, at the moorings at Kingstown or Liverpool.

I do not find that the difference of one or two revolutions of the engines makes a very perceptible increase or decrease in the consumption of coal; and, as we are always under steam, and the work regular, it does not vary a great deal. Taking the speed of the engines at 23 revolutions, I consider the consumption of our Liverpool coal to be about 12½ lbs. per horse power per hour.

The distance from George's Pier head to Kingstown harbour, through the rock channel, as mentioned by chart, is about 119 nautical miles; some allowance, however, should be made for the New Channel, and traverse.

In my opinion, taking the distance at 122 miles, will be a fair medium.

I am, Sir, your most obedient Servant,

To Captain Chappel, R.N. (Signed) E. H. Townley, Lieut. Com.

An Account of the Consumption of Coals per Hour on Board of H. M. Packet Thetis, from the 1st to the 18th of June, 1837.

DATE.		Hours	Consumption of Coals in Pounds per Hour.	No. of Hours Steam up.	REMARKS.
1837.					
To Kingstown.					
June 1st,	P.M.	4	4480		Consumption of Coals at 4 and 5, P.M., is for raising the steam at Liverpool, proceeding from the moorings to the Pier Head, and thence, waiting for mail, until a few minutes after 5, when the Packet generally sails.
—	—	5	1120		
—	—	6	2240		
—	—	7	2016		
—	—	8	2016		
—	—	9	2016		
—	—	10	2016		
—	—	11	2016		
—	—	12	2016		
June 2nd,	A.M.	1	2016		
—	—	2	2016		
—	—	3	2016		
—	—	4	2016		
—	—	5	2016		
—	—	6	2016		
—	—	7	Steam down	16	Arrived at Kingstown. Boilers not blown off at Kingstown moorings.

Note I.
Hourly consumption of Coals.

Mail Packet Thetis.

AN ACCOUNT of the Consumption of COALS per Hour on Board of H. M. Packet THETIS, from the 1st to the 18th of June, 1837—*continued.*

DATE.	Hours.	Consumption of Coals in Pounds per Hour.	No. of Hours Steam up.	REMARKS.
1837.				
To Liverpool.				
June 2nd, P.M.	4	2240		From 4 to 6, for raising steam again, steaming to the pier or jetty, waiting for mail, &c., making up fires for starting, and setting on generally a few minutes before 6.
– –	5	1120		
– –	6	2016		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	2016		
– –	11	2016		
– –	12	2016		
June 3rd, A.M.	1	2016		
– –	2	2016		
– –	3	2016		
– –	4	2016		
– –	5	2016		
– –	6	2016		
– –	7	2016		
– –	8	2016		
– –	9	Steam down.	18	Arrived at Liverpool. Boilers always blown off at Liverpool moorings.
To Kingstown.				
June 4th, P.M.	4	4480		Consumption of Coals at 4 and 5 P. M., is for raising the steam at Liverpool, proceeding from the moorings to the Pier Head, and thence waiting for mail until a few minutes after 5, when the Packet generally sails.
– –	5	1120		
– –	6	2240		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	2016		
– –	11	2016		
– –	12	2016		
June 5th, A.M.	1	2016		
– –	2	2016		
– –	3	2016		
– –	4	2016		
– –	5	2016		
– –	6	2016		
– –	7	Steam down.	16	Arrived at Kingstown. Boilers not blown off at Kingstown moorings.
To Liverpool.				
June 5th, P.M.	4	2240		From 4 to 6 is for raising steam again, steaming to the pier or jetty, waiting for mail, &c., making up fires for starting, and setting on generally a few minutes before 6.
– –	5	1120		
– –	6	2016		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	2016		
– –	11	2016		
– –	12	2016		
June 6th, A.M.	1	2016		
– –	2	2016		
– –	3	2016		
– –	4	2016		
– –	5	2016		
– –	6	2016		
– –	7	2016		
– –	8	2016		
– –	9	Steam down.	18	Arrived at Liverpool. Boilers always blown off at Liverpool moorings.
To Kingstown.				
June 7th, P.M.	4	4480		Consumption of Coals at 4 and 5 P. M., is for raising steam at Liverpool, proceeding from the moorings to the Pier Head, and thence, waiting for mail until a few minutes after 5, when the Packet generally sails.
– –	5	1120		
– –	6	2240		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	2016		
– –	11	2016		
– –	12	2016		

An Account of the Consumption of Coals per Hour on Board of H. M. Packet Thetis, from the 1st to the 18th of June, 1837—*continued.*

Note I.
Hourly consumption of Coals.

Mail Packet Thetis.

DATE.	Hours.	Consumption of Coals in Pounds per Hour	No. of Hours Steam up.	REMARKS.
1837.				
To Kingstown.				
June 8th, A.M.	1	2016		
– –	2	2016		
– –	3	2016		
– –	4	2016		
– –	5	2016		
– –	6	2016		
– –	7	Steam down.	16	Arrived at Kingstown. Boilers not blown off at Kingstown moorings.
To Liverpool.				
June 8th, P.M.	4	2240		From 4 to 6, is for raising steam again, steaming to the pier or jetty, waiting for mail, &c., making up fires for starting, and setting on, generally a few minutes before 6.
– –	5	1120		
– –	6	2016		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	2016		
– –	11	1792		
– –	12	1792		
June 9th, A.M.	1	1792		
– –	2	1792		
– –	3	1792		
– –	4	1792		
– –	5	2016		
– –	6	2016		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	Steam down.	19	Arrived at Liverpool. Boilers always blown off at Liverpool moorings.
To Kingstown.				
June 10th, P.M.	4	4480		Consumption of Coals at 4 and 5 P.M., is for raising the steam at Liverpool, proceeding from the moorings to the Pier Head, and thence waiting for mail until a few minutes after 5, when the Packet generally sails.
– –	5	1120		
– –	6	2240		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	2016		
– –	11	2016		
– –	12	2016		
June 11th, A.M.	1	1729		
– –	2	1729		
– –	3	1729		
– –	4	2016		
– –	5	2016		
– –	6	2016		
– –	7	2016		
– –	8	Steam down.	17	Arrived at Kingstown. Boilers not blown off at Kingstown moorings.
To Liverpool.				
June 11th, P.M.	4	2240		From 4 to 6, is for raising steam again, steaming to the pier or jetty, waiting for mail, &c., making up fires for starting, and setting on, generally a few minutes before 6.
– –	5	1120		
– –	6	2016		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	2016		
– –	11	2016		
– –	12	2016		
June 12th, A.M.	1	2016		
– –	2	2016		
– –	3	2016		
– –	4	2016		
– –	5	2016		
– –	6	2016		
– –	7	Steam down.	16	Arrived at Liverpool. Boilers always blown off at Liverpool moorings.

Note I.
Hourly consumption of Coals.
Mail Packet Thetis.

An Account of the Consumption of Coals per Hour on Board of H. M. Packet Thetis, from the 1st to the 18th of June, 1837—*continued.*

DATE.	Hours.	Consumption of Coals in Pounds per Hour.	No. of Hours Steam up.	REMARKS.
1837. To Kingstown.				
June 13th, P.M.	4	4480		Consumption of Coals at 4 and 5 P.M., is for raising the steam at Liverpool, proceeding from the moorings to the Pier Head, and thence, waiting for mail until a few minutes after 5, when the Packet generally sails.
– –	5	1120		
– –	6	2240		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	2016		
– –	11	2016		
– –	12	2016		
June 14th, A.M.	1	2016		
– –	2	2016		
– –	3	2016		
– –	4	2016		
– –	5	2016		
– –	6	2016		
– –	7	Steam down.	16	Arrived at Kingstown. Boilers not blown off at Kingstown moorings.
To Liverpool.				
June 14th, P.M.	4	2240		From 4 to 6, is for raising steam again, steaming to the pier or jetty, waiting for mail, &c., making up fires for starting, and setting on generally a few minutes before 6.
– –	5	1120		
– –	6	2016		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	2016		
– –	11	2016		
– –	12	2016		
June 15th, A.M.	1	2016		
– –	2	2016		
– –	3	2016		
– –	4	2016		
– –	5	2016		
– –	6	2016		
– –	7	2016		
– –	8	Steam down.	17	Arrived at Liverpool. Boilers always blown off at Liverpool moorings.
To Kingstown.				
June 16th, P.M.	4	4480		Consumption of Coals at 4 and 5 P.M., is for raising the steam at Liverpool, proceeding from themooring to the Pier Head, and thence, waiting for mail until a few minutes after 5, when the Packet generally sails.
– –	5	1120		
– –	6	2240		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	2016		
– –	11	2016		
– –	12	2016		
June 17th, A.M.	1	2016		
– –	2	2016		
– –	3	2016		
– –	4	2016		
– –	5	2016		
– –	6	2016		
– –	7	2016		
– –	8	Steam down.	17	Arrived at Kingstown. Boilers not blown off at Kingstown moorings.
To Liverpool.				
June 17th, P.M.	4	2240		From 4 to 6 is for raising steam again, steaming to the pier or jetty, waiting for mail, &c., making up fires for starting, and setting on, generally a few minutes before 6.
– –	5	1120		
– –	6	2016		
– –	7	2016		
– –	8	2016		
– –	9	2016		
– –	10	2016		
– –	11	2016		
– –	12	2016		

An Account of the Consumption of Coals per Hour on Board of H. M. Packet Thetis, from the 1st to the 18th of June, 1837—*continued.*

Note I.
Hourly consumption of Coals.
Mail Packet Thetis.

DATE.	Hours.	Consumption of Coals in Pounds per Hour.	No. of Hours Steam up.	REMARKS.
1837. To Liverpool.				
June 18th, A.M.	1	2016		
– –	2	2016		
– –	3	2016		
–	4	2016		
– –	5	2016		
– –	6	2016		
– –	7	Fires backed.	16	Arrived at Liverpool. Waiting for tide to go into dock.

(Signed) C. H. Townley.

NOTE K.

Note K.
Time employed by H.M. Mail Packets between Liverpool and Kingstown.
Comet.

Return, showing the length of time employed by H.M. Mail Packets, between Liverpool and Kingstown, distance 122 miles, from 1st January, 1837, to June, 1837.

COMET—437 Tons; 190 Horse Power.

Date.	Liverpool to Kingstown.		Kingstown to Liverpool.		Date.	Liverpool to Kingstown.		Kingstown to Liverpool.	
1837.	H.	M.	H.	M.	1837.	H.	M.	H.	M.
January, 23	14	23	-	-	March 28	-	-	12	4
24	-	-	15	50	30	13	0	-	-
26	11	43	-	-	31	-	-	12	7
27	-	-	20	0	April 2	14	0	-	-
29	12	45	-	-	3	-	-	14	37
30	-	-	16	0	5	12	30	-	-
February, 1	14	52	-	-	6	-	-	13	30
2	-	-	13	11	8	13	28	-	-
4	12	38	-	-	9	-	-	15	15
5	-	-	14	29	11	13	58	-	-
7	14	47	-	-	12	-	-	14	3
8	-	-	14	40	14	12	9	-	-
10	14	40	-	-	15	-	-	11	56
11	-	-	11	56	17	14	20	-	-
13	13	30	-	-	18	-	-	12	53
14	-	-	11	47	20	13	3	-	-
16	14	47	-	-	21	-	-	12	56
17	-	-	12	41	23	13	12	-	-
19	22	3	-	-	24	-	-	14	47
20	-	-	14	48	26	13	25	-	-
22	27	8	-	-	27	-	-	11	38
23	-	-	14	18	29	12	10	-	-
25	15	40	-	-	30	-	-	12	2
26	-	-	12	42	May 13	12	39	-	-
28	12	39	-	-	14	-	-	11	40
March, 1	-	-	13	55	16	11	58	-	-
3	12	3	-	-	17	-	-	12	33
4	-	-	12	53	19	12	16	-	-
6	13	2	-	-	20	-	-	13	22
7	-	-	13	41	22	12	52	-	-
9	16	31	-	-	23	-	-	12	52
10	-	-	13	57	25	13	32	-	-
12	13	18	-	-	26	-	-	11	23
13	-	-	13	49	28	11	33	-	-
15	11	54	-	-	29	-	-	11	59
16	-	-	14	27	31	12	20	-	-
18	11	55	-	-	June 1	-	-	12	40
19	-	-	14	39	3	12	44	13	2
21	12	33	-	-	6	12	51	-	-
22	-	-	13	40	7	-	-	13	3
24	12	43	-	-	9	12	28	-	-
25	-	-	13	4	10	-	-	13	12
27	15	4	-	-					

Note K.

Time employed by H.M. Mail Packets between Liverpool and Kingstown.

Etna.

ETNA.

Date.	Liverpool to Kingstown.		Kingstown to Liverpool.		Date.	Liverpool to Kingstown.		Kingstown to Liverpool.	
1837.	H.	M.	H.	M.	1837.	H.	M.	H.	M.
January, 15	12	53	-	-	March, 28	20	32	-	-
16	-	-	12	45	29	-	-	13	40
17	13	12	-	-	31	13	0	-	-
18	-	-	13	22	April, 1	-	-	12	57
19	13	8	-	-	2	-	-	-	-
20	-	-	13	48	3	15	0	-	-
21	13	36	-	-	4	-	-	14	54
22	-	-	14	46	6	15	9	-	-
24	14	46	-	-	7	-	-	15	20
25	-	-	14	19	9	12	3	-	-
27	12	53	-	-	10	-	-	15	36
28	-	-	18	8	12	14	0	-	-
30	12	56	-	-	13	-	-	17	27
31	-	-	14	15	15	14	56	-	-
February, 2	12	55	-	-	16	-	-	13	21
3	-	-	14	22	18	14	6	-	-
5	13	56	-	-	19	-	-	14	10
6	-	-	15	16	21	17	43	-	-
8	14	10	-	-	22	-	-	14	56
9	-	-	13	58	24	15	30	-	-
11	15	41	-	-	25	-	-	13	53
12	-	-	12	42	27	15	4	-	-
14	15	46	-	-	28	-	-	12	45
15	-	-	12	50	30	14	2	-	-
17	18	40	-	-	May, 1	-	-	13	17
18	-	-	14	0	3	14	25	-	-
20	22	35	-	-	4	-	-	14	45
21	-	-	14	28	6	13	56	-	-
23	21	5	-	-	7	-	-	14	40
24	-	-	15	50	9	14	28	-	-
26	14	40	-	-	10	-	-	14	10
27	-	-	14	34	12	13	55	-	-
March, 1	12	38	-	-	13	-	-	12	34
2	-	-	12	48	15	12	59	-	-
4	13	2	-	-	16	-	-	13	21
5	-	-	13	55	18	16	2	-	-
7	13	29	-	-	19	-	-	15	17
8	-	-	14	33	21	14	5	-	-
10	20	5	-	-	21	-	-	14	59
11	-	-	13	18	June, 4	13	20	-	-
13	16	3	-	-	5	-	-	13	46
14	-	-	14	11	7	13	32	-	-
16	12	46	-	-	8	-	-	17	36
17	-	-	13	45	10	14	34	-	-
19	13	0	-	-	11	-	-	12	42
20	-	-	16	2	13	14	40	-	-
22	15	54	-	-	14	-	-	12	44
23	-	-	14	48	16	12	41	-	-
25	15	9	-	-	17	-	-	13	32
26	-	-	14	7					

Dolphin.

DOLPHIN.

Date.	Liverpool to Kingstown.		Kingstown to Liverpool.		Date.	Liverpool to Kingstown.		Kingstown to Liverpool.	
1837.	H.	M.	H.	M.	1837.	H.	M.	H.	M.
May, 2	13	26	-	-	May, 22	12	45	-	-
3	-	-	13	6	24	-	-	11	34
5	12	53	-	-	26	13	2	-	-
6	-	-	13	14	27	-	-	10	26
8	12	36	-	-	29	10	45	-	-
9	-	-	13	26	30	-	-	11	30
11	13	23	-	-	June, 1	12	21	-	-
12	-	-	11	12	2	-	-	12	41
14	11	49	-	-	12	13	29	-	-
15	-		11	31	13	-	-	11	17
17	11	43	-	-	15	11	33	-	-
18	-	-	12	40	16	-	-	12	10
20	11	58	-	-	18	12	14	-	-
21	-	-	12	31	19	-	-	12	52

Note K.
Time employed by H.M. Mail Packets between Liverpool and Kingstown.

Thetis.

THETIS.

Date.	Liverpool to Kingstown.		Kingstown to Liverpool.	
1837.	H.	M.	H.	M.
January 16	12	40	-	-
17	-	-	11	45
18	11	59	-	-
19	-	-	12	30
20	12	5	-	-
21	-	-	13	25
25	11	45	-	-
26	-	-	17	10
28	12	15	-	-
29	-	-	16	20
31	11	44	-	-
February 1	-	-	11	45
3	11	25	-	-
4	-	-	13	20
6	12	48	-	-
7	-	-	14	35
9	13	30	-	-
10	-	-	14	50
12	22	2	-	-
13	-	-	11	30
15	12	5	-	-
16	-	-	12	10
18	13	29	-	-
19	-	-	13	50
21	19	40	-	-
22	-	-	15	45
25	17	30	13	20
27	12	38	-	-
28	-	-	11	55
March 2	11	40	-	-
3	-	-	12	15
5	12	9	-	-
6	-	-	13	0
8	12	50	-	-
9	-	-	14	53
11	15	30	-	-
12	-	-	13	37
14	11	50	-	-
15	-	-	12	30
17	11	24	-	-
18	-	-	12	40
20	11	50	-	-
21	-	-	14	15
23	12	15	-	-
24	-	-	14	25
26	14	30	-	-
27	-	-	12	40
29	15	3	-	-
30	-	-	11	5
1837.	H.	M.	H.	M.
April 1	12	3	-	-
2	-	-	12	10
4	12	28	-	-
5	-	-	15	0
7	12	55	-	-
8	-	-	13	27
10	12	20	-	-
11	-	-	11	15
13	11	28	-	-
14	-	-	11	47
16	12	17	-	-
17	-	-	12	53
19	12	0	-	-
20	-	-	12	21
22	12	12	-	-
23	-	-	12	22
25	12	36	-	-
26	-	-	11	50
28	11	59	-	-
29	-	-	11	45
May 1	18	25	-	-
2	-	-	12	22
4	12	0	-	-
5	-	-	12	55
7	12	25	-	-
8	-	-	11	55
10	12	50	-	-
11	-	-	11	37
24	12	50	-	-
25	-	-	12	0
27	12	49	-	-
28	-	-	11	8
30	12	19	-	-
31	-	-	12	5
June 2	12	39	-	-
3	-	-	12	45
5	12	30	-	-
6	-	-	12	20
8	12	8	-	-
9	-	-	14	30
11	14	9	-	
12	-	-	11	5
14	11	45	-	-
15	-	-	11	45
17	12	20	-	-
18	-	-	12	35

ABSTRACT FORMED FROM THE PRECEDING RETURNS.

Abstract formed from preceding Returns.

MEAN TIME to and from LIVERPOOL and KINGSTOWN for each Month, from January to June, 1837.

COMET.					ETNA.				
Months.	Liverpool to Kingstown.		Kingstown to Liverpool.		Months.	Liverpool to Kingstown		Kingstown to Liverpool.	
	H.	M.	H.	M.		H.	M.	H.	M.
January, -	12	57	17	17	January, -	13	20	14	29
February, -	16	16	13	23	February, -	16	34	14	13
March, -	13	12	12	34	March, -	15	3	14	7
April, -	13	13	13	21	April, -	14	45	14	32
May, -	12	27	12	18	May,	14	16	14	6
June, -	12	40	12	59	June, -	13	45	14	4
General mean,	13	27	13	38	General mean,	14	37	14	15

Note K.
Abstract formed from preceding Returns.

ABSTRACT FROM THE PRECEDING RETURNS.

MEAN TIME to and from LIVERPOOL and KINGSTOWN, for each Month, from January to June, 1837.

DOLPHIN.					THETIS.				
Months.	Liverpool to Kingstown.		Kingstown to Liverpool.		Months.	Liverpool to Kingstown.		Kingstown to Liverpool.	
	H.	M.	H.	M.		H.	M.	H.	M.
January, -	-	-	-	-	January, -	12	5	11	51
February, -	-	-	-	-	February, -	15	1	13	18
March, -	-	-	-	-	March, -	12	54	13	8
April, -	-	-	-	-	April, -	12	14	12	29
May, -	12	26	12	7	May, -	13	22	12	0
June, -	12	24	12	15	June, -	12	35	12	32
General mean,	12	25	12	11	General mean,	13	12	12	33

Mean time of passage of all the vessels from Liverpool to Kingstown, 13*h.* 23*m.*; from Kingstown to Liverpool, 13*h.* 9*m.*; mean speed, 9 nautical miles per hour. The distance is about 122 nautical miles.

The foregoing mean is deduced from the monthly means.—From a mean of the whole, the mean from Liverpool to Kingstown, is 13 hours 30 minutes; from Kingstown to Liverpool, 13 hours.

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APPENDIX.

No. I.

OUTLINE OF THE GEOLOGY OF IRELAND,

BY RICHARD GRIFFITH, ESQ., ONE OF THE COMMISSIONERS.

GEOLOGICAL STRUCTURE OF IRELAND.

Appendix, No. I.

Geological Structure of Ireland.

The bearing of Geology on agriculture and commerce is now so universally admitted as to require no comment in this place, and at the present period, when the development of the resources of Ireland has become a subject of anxious solicitude throughout Great Britain, and when legislative measures of a vital nature are under discussion, of which the object is to ameliorate the condition of the Irish people, the study of the physical and geological structure of the country becomes interesting and important, as bearing upon its metallic and coal mines, upon the formation of common roads and Railroads, and, above all, upon the nature and agricultural properties of the different soils, which are chiefly derived from the disintegration of the neighbouring rocks.

If we look to the map of Europe, we find Ireland stretching westward into the Atlantic Ocean beyond all other lands; and from its insular position, and its great exposure, on the north, west, and south, to the Atlantic wave, its coast, as might be expected, is in many parts indented by deep bays, protected by jutting promontories, which have hitherto withstood the fierce assaults to which they are exposed; and these bays and promontories are most numerous and remarkable on the south-west coast, that being the point of the prevailing winds.

It is remarkable, that the rock which forms the bed or bottom of the greater number of these deep bays and estuaries consists of the secondary, or carboniferous limestone, while the projecting promontories situated to the north and south of each, are composed, for the most part, of primary or transition rocks, and particularly of granite, mica slate, quartz rock, greywacke, and old red sandstone conglomerate.

Though the physical and geological structure of Ireland is similar to that of England, still the relative geographical position of the different rocks is essentially different. In England, the mountain ranges, consisting of the primary and transition classes, are situated near the west coast, and the newer strata are successively accumulated on each other to the east and south; in which directions the country is comparatively flat. In Ireland, on the contrary, the coast is for the most part mountainous, while the interior is flat, and rarely presents hills of considerable elevation. Thus, we find the primary mountains of Antrim, Derry, and Donegal occupying the north and north-west coasts; those of Sligo, Mayo, Galway, and Kerry the west and south-west. The slate districts of Cork and Waterford form the south and south-east; while the lofty mountains of Wicklow, Louth, and Down are situated on the east coast.*

---

* *Heights of the principal Mountains of Ireland, as ascertained by the Ordnance Survey.*

ANTRIM.	
Knocklayd, - -	1,685 feet,
Throstan, - -	1,810 ,,
Slemish, - - -	1,437 ,,
Divis, - - -	1,568 ,,
LONDONDERRY.	
Sawel, - - -	2,236 ,,
Benbradagh, - -	1,531 ,,
Carntogher, - -	1,521 ,,
Slievegallion, - -	1,730 ,,
DONEGAL.	
Errigal, - - -	2,462 ,,
Muckish, - - -	2,190 feet.
Slievesnaght, east, -	2,019 ,,
Bluestack, -	2,213 ,,
DOWN.	
Slievedonard, - -	2,796 ,,
Slievebingian - -	2,449 ,,
Eagle Mountain, -	2,084 ,,
Slievecroob, - -	1,755 ,,
ARMAGH.	
Slievegullion, - -	1,893 ,,
FERMANAGH.	
Belmore, - - -	1,312 ,,
Carnmore, - -	1,034 ,,

Appendix. No. I.

Geological Structure of Ireland.

These mountain tracts rarely extend more than twenty miles inland; and we find the interior, with trifling exceptions, composed of flat or gently swelling grounds, covered by a rich and fruitful soil.

This peculiar conformation of the surface has been the origin of the great number of rivers with which our coasts abound; they have their sources in the neighbouring mountains, from whence they flow in short but rapid courses directly into the sea.

The Shannon forms the most striking example of the rivers of the interior, flowing slowly through the flat country. This great river has its source in a limestone cavern, situated in the Valley of Lough Allen, in the county of Cavan; it issues from a circular gulf, about fifty feet in diameter, and at once assumes the character of a considerable river.

Lough Allen, situated five miles to the south of this source, is generally considered to be the head of the Shannon, and is the point at which its navigation terminates. This lake is elevated but 160 feet above the level of the sea, while the course of the river to the tide-way at Limerick, is 140 miles in length, which gives an average fall of but 1 foot 2 inches in a mile; but this average fall, trifling as it may appear, is not equally distributed, as the greater portion of it, amounting to 98 feet, takes place between Lough Derg and Limerick, a distance of but 10 miles, leaving a fall of only 62 feet between Lough Allen and Lough Derg, in a distance of 127 miles, which is rather less than six inches in a mile.*

There are several other rivers which have their sources in the interior of Ireland, but they are insignificant when compared with the Shannon. They all exhibit the same sluggish character, and when the slow current of the water is interrupted by any impediment, have the same tendency to flood the flat country on either side for a considerable extent.†

Exclusive of the tributaries to the Shannon, namely, the Boyle River, the Suck, the Camlin, the Inny, and the Great and Little Brusna, the most important rivers of the interior of central Ireland are the Barrow, which takes its rise in the Slieve Bloom Mountains, the Boyne, the Blackwater, and the Little Barrow, all of which have their sources in the Bog of Allen, in the county of Kildare, which in this part forms the summit of the flat country between the Irish sea and the Valley of the Shannon.

This bog does not in any part exceed the height of 300 feet above the level of the sea, while the summit level of the Grand Canal, which passes through the centre of it, is about 270 feet above the mean tide level in Dublin Bay.

The peculiar flatness of the interior of Ireland has been the probable cause

CAVAN.	
Cuilcagh, - - -	2,188 feet.
LEITRIM.	
Benbo, - - -	1,365 „
Lackagh - - -	1,448 „
Slieveanierin, - -	1,922 „
SLIGO.	
Truskmore, - - -	2,113 „
Benbulbin, - - -	1,697 „
ROSCOMMON.	
Slievebon, north, - -	839 „
„ south, - -	857 „
LONGFORD.	
Carnclonhugh, - -	912 „
MAYO.	
Nephin, - - -	2,639 „
Croaghpatrick, - -	2,499 „
Muilrea, - - -	2,680 „
GALWAY.	
Twelvepins, (highest of)	2,396 „
Beinnacoire, - - -	2,337 „
LOUTH.	
Carlingford, - -	1,935 „
Ravensdale, - - -	1,674 „
WICKLOW.	
Kippure, - - -	2,473 „
Great Sugarloaf, - -	1,651 „
Lugnaquilla, - - -	3,039 „
CARLOW.	
Mount Leinster, - -	2,604 „
QUEEN'S COUNTY.	
Slievebloom, Arden Erin, } - -	1,689 feet.
KILKENNY.	
Brandon, - - -	1,696 „
TIPPERARY.	
Keeper, - - -	2,265 „
Devil's Bit, - - -	1,572 „
Slievenaman, - -	2,362 „
Galtymore, - - -	3,008 „
CLARE.	
Craig, - - - -	1,715 „
Knockaness, - - -	1,305 „
Callan, - - -	1,288 „
LIMERICK.	
Knockfeerna, - - -	937 „
Seefin, - - - -	1,706 „
KERRY.	
Brandon, - - -	3,120 „
Gurrane Tual, - -	3,404 „
Mangerton, - - -	2,754 „
CORK.	
Mount Gabriel, - -	1,335 „
Cahirfarna - - -	2,234 „
Sheehy, - - -	1,796 „
Hungry Hill, - -	2,248 „
The Paps, - - -	2,280 „
WATERFORD.	
Monavullagh, - -	2,598 „

---

* The peculiarities of the River Shannon, and the remarkable facility with which it can be rendered navigable for steam vessels of a large class, are fully described in the Report of the Commissioners for the Improvement of the Navigation of that River.

† Vast tracts of land are rendered comparatively of little value, in consequence of these floods.

Appendix.
No. I.
Geological Structure of Ireland.

of those vast accumulations of alluvial matter, composed of clay and limestone gravel, which in the form of low but steep ridges of hill, occur so abundantly throughout the middle districts, and which are generally known by the name of Eskers. These ridges of limestone gravel probably originated at a period when the country was either wholly or partially submerged, from eddies formed by undulations in the surface.

That the surface of the country was exposed to the action of rapid currents of water, is evidenced by the deep parallel scratches, sometimes amounting to furrows, which may be frequently observed on the surface of solid rocks, when the diluvial soil has been removed. It is probable, also, that the gravel hills were rapidly deposited from water in violent action, from their frequently consisting of an intermixture of large masses of rock partially rounded, with small gravel, and even with clay and sand.

The origin of those immense tracts of bog, which are everywhere spread over the interior of the flat country, may also be attributed to the stagnant water pent up, as we now find it, above the level of the dry country, by gravel hills, which form a continuous ridge, though not of equal height, round the bog edge.*

Thus we find Eskers surrounding the several divisions of the great Bog of Allen, and the whole of the bogs contained in the valleys of the rivers Shannon, Suck, Brusna, Camlin, Inny, and the Barrow, and of its several tributary streams. The surface of the whole of these bogs is elevated considerably, frequently 20 feet, above the level of the surrounding dry country—a circumstance which would render their drainage a work of great facility, and comparatively trifling expense; it having been ascertained by the concurrent testimony of the Civil Engineers employed by Parliament to ascertain the practicability and expense of improving the bogs of Ireland, that the cost of draining would not exceed £1 5*s.* per acre; and, in many cases, the object can be attained for half that sum. The reclamation also is comparatively easy and simple, as the gravel hills afford in abundance the very best manure for the purpose, and where the bogs are shallow, a similar substance, combined with white marl, may be raised without difficulty from the bottom of the drains.†

In many parts of Ireland the study of the gravel hills becomes highly interesting and instructive, as throwing a light on the direction of the current of the waters. Thus in the county of Mayo, to the eastward of the town of Westport, the whole of the numerous gravel hills, with which the country is studded, are extremely narrow in a north and south direction, and very long in an east and west direction, having bluff faces at the eastern extremity, and deep and lengthened valleys between them. This fact shows that, in this place, the direction of the current was westward, towards Clew Bay: and it may be remarked that the whole of the limestone gravel islands in that bay partake of the appearance and character of inland gravel hills. In the northern part of the county of Mayo, near to Lough Conn, and Killalla Bay, the direction of the gravel hills is north and south, having their bluff heads to

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* The bottom of the bog is always lower than the present outlet for the water.

† It is remarkable, that no marine or terrestrial shells have hitherto been discovered in the gravel of the Eskers.

It is in the white calcareous marl frequently met with at the bottom of the bogs, that the horns and skeletons of those remarkable animals are found, which are known and admired by naturalists in every part of Europe, under the name of the Irish Elk.

The celebrated French naturalist, Cuvier, describes the fossil Elk of Ireland as the most remarkable of the remains of ruminating animals. According to him, it is certainly of a different species from any of those that at present live on the earth's surface, and may, therefore, be considered as extinct.

The fossil remains of the Irish Elk were first brought into notice by Doctor Molyneux, who published in the Philosophical Transactions, an account of an extraordinary pair of horns, attached to the skull, which were dug out of a marl pit, at Dardistown, near Drogheda, in the county of Louth. In these the distance between the tips of the horns was 10 feet 10 inches.

Within the last ten years, many nearly perfect skeletons of the fossil Elk have been discovered, in white marl, in different parts of Ireland; and one, in particular, which was found beneath a small bog, near Bruff, in the county of Limerick, and presented to the Royal Dublin Society, by Archdeacon Maunsell, of Limerick. In this splendid specimen, now in the museum of the Society, the height of the shoulders is 7 feet 2 inches; the distance between the tips of the horns 10 feet 10 inches; height of the tip of the horn, 10 feet 4 inches. Several skeletons of the Elk have also been discovered, in similar situations, in the county of Wexford; and one specimen, nearly, if not fully equal to that in the possession of the Royal Dublin Society, is now preserved in the Anatomical Museum at Cambridge, and another, of equal value, in the Museum of the College of Surgeons in Dublin.

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Geological Structure of Ireland.

the south; hence it may be argued, that in this vicinity the current took a northerly course.

The central district of Ireland contains upwards of one million of acres of bog, comprehended between lines drawn from Wicklow Head to Galway, and from Howth Head to Sligo, the whole of which may be easily drained, and a considerable portion reclaimed, at a moderate expense.

It is true that the general reclamation cannot be at once attempted without incurring a very great expense, and, in many cases, the cost would be so considerable as to render the speculation hazardous; but, in all cases, the drainage might be effected with advantage, as by this means the surface of the bogs would become pasturable and profitable.

Rocks of Ireland.

OF THE ROCKS OF IRELAND.

The composition, character, and relative positions of the rocks of Ireland are similar to those of other countries; the only very remarkable feature being the unusual preponderance of the carboniferous limestone,* which extends throughout the whole of the flat districts, and forms the surface rock of nearly two-thirds of the country.

The rocks of Ireland may be divided into two great classes; namely, the stratified or sedimentary, and the unstratified or crystalline: the first has been evidently deposited from water, while the second has probably been the result of igneous action.

Sedimentary, or Stratified Rocks.

The Sedimentary, or *Stratified Rocks*, including the primary and transition series, are, for the most part, very regularly arranged in beds, having a range or strike, varying from 40° to the north of east, and south of west, to east and west; the former being prevalent in the northern counties, and the latter in the southern. The dip, of course at right angles to the strike, sometimes inclining towards the northward, but more frequently towards the southward, at angles varying from 10° to 80° from the horizon. This variation in the bearing or direction of the dip and also of its angle of inclination, arises from an undulatory arrangement of the strata, which is preserved throughout the country, and consequently, at the apex of every undulation, a change in the dip must take place, either to the north or south; the direction of the apex of the undulation, or the anticlinal line, as it is now technically called, being parallel to the strike of the strata.

In respect to the dip, there is one very remarkable fact observable throughout the southern counties, namely, that it is usually towards the south, and when a reverse dip occurs, it continues, comparatively, but for a short distance; but the strata on the nórth side of the anticlinical axis are observed to incline, at a very steep angle from the horizon, usually from 70° to 85°, and sometimes they are quite vertical. Continuing to the southward, the strata are again observed gradually to incline to the south, till at length they resume their usual angle of about 40° from the horizon. This circumstance has frequently led to an erroneous conclusion as to the absolute thickness of some of the rock formations; for if the slate, or other strata, be observed to dip to the south for ten miles, at an average angle of 30°, it is reasonably concluded that the thickness in that part amounts to 5 miles; but this is certainly not the case; as from observations carefully made, both on the sea coast, and in several precipices and quarries in the interior, it has been ascertained, that although, when seen at the surface, the whole of the strata dip towards the south, still these strata consist of a series of convolutions, frequently on a small scale, both sides of which incline to the southward, though usually at different angles; and this peculiarity is general throughout the southern counties, and is alike observable in the strata belonging to the transition slate, the carboniferous limestone, and the great anthracitous coal formation, which extends through the counties of Clare, Limerick, Kerry, and Cork, as hereinafter described.

In the northern counties the same tendency to a southern dip does not appear to prevail: the length of the inclinations on the opposite sides of the undulations being nearly equal; but in some districts, particularly in the counties of Antrim, Derry, and Donegal, the continuation of the dip in one direction, without any undulation, is very considerable.

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* Called mountain limestone in England.

Geological Structure of Ireland.

Primary and Transition Districts.

OF THE PRIMARY AND TRANSITION DISTRICTS.

Ireland contains five districts composed of primary or transition rocks, situated near the sea coast, and which are detached from each other by the interposition of strata belonging to the secondary limestone series.

Primary Districts.

Primary Districts.—The most extensive primary district occurs on the north-west coast, and occupies the greater part of the counties of Donegal, Derry, and Tyrone. The second is situated on the north-east coast of the county of Antrim, and consists of a small mountain group, which is highly interesting. The third occupies the western portions of the counties of Galway and Mayo, and extends in a north-eastern direction, into the counties of Sligo and Leitrim, in the form of a long and narrow ridge, known by the name of the Ox Mountains. These districts contain rocks belonging to the crystalline or igneous class, as well as those of the sedimentary.

The igneous consist of granite, sienitic granite, greenstone, and greenstone porphyry; and the sedimentary, of mica slate, shining slate, quartz rock, and primary limestone; the latter are all regularly stratified; the general range or strike being north-east and south-west; from which, however, there are some remarkable variations.

Transition Rocks.

Transition Rocks.—The mountain districts chiefly composed of transition rocks are situated on the east, south-east, and south-west coasts.

Commencing with the most northerly, we find rocks belonging to this class, occupying considerable portions of the counties of Down, Armagh, Monaghan, Cavan, Louth, Meath, Longford, and Roscommon.

This northern district is, most probably, a prolongation of the greywacke district of Scotland, which commences at St. Abb's Head, on the Firth of Forth, and extends, in a south-western direction, across the country, to Portpatrick on the west coast; it appears again at Donaghadee, on the east coast of Ireland, and continues in the same direction to Cairnclonhugh mountain, in the county of Longford.

The rocks contained in this district consist of greywacke slate, fissile clay slate, flint slate, chlorite slate; and in the neighbourhood of the granite district, of hornblende slate, schistose porphyry, and a variety of other metamorphic rocks, having structures intermediate between sedimentary and crystalline, which it is impossible to designate by any precise name.

In addition to the foregoing, the district contains the following decidedly crystalline or igneous rocks, viz.,

In great masses—Granite,
Sienitic Granite,
Greenstone Porphyry,
Clay Porphyry,
In dikes—Trap,
Pitchstone,
Porphyry.

The fifth district extends through the counties of Kildare, Wicklow, Wexford, and Kilkenny. It contains rocks very similar to those of the northern district, with this exception, that in the vicinity of the granite, beds of mica slate occur, which are wanting, or are of rare occurrence in the other.*

Among the igneous or protruded rocks of the primary and transition districts, granite appears to be the most ancient as well as the most extensive.

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* The mica slate, and micaceous shining slate which occur at Seechon Mountain, and other localities along the western boundary of the granite district of the county of Wicklow, adjoining the counties of Kildare and Dublin, appear to belong to the greywacke series. At Rathcoole, in the county of Kildare, the strike of the strata is north-east, and south-west, and the dip south-east. If we follow the direction of the dip, the same strike and inclination of the strata is observed to continue up to the contact with the granite, where we find the rock to consist of micaceous slate. Under such circumstances, we must consider this rock to form an upper member of the transition series, which commences at Rathcoole, and, consequently, that it is not true mica slate, but an altered greywacke slate.

In the county of Wicklow, on the eastern side of the granite boundary, we find a schistose micaceous rock resting on the granite, the general direction of whose strike, though much disturbed by the irregularities of the outline of the subjacent crystalline rock, is north-east and south-west,

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Geological Structure of Ireland.

Transition Rocks.

By reference to the Geological Map, it will be seen, that the general direction of the granite districts of Ireland, which are shaded lake color, is north-east and south-west, parallel to the general strike of the slate rocks. Hence it appears, that this rock, while in a state of fusion, forced a passage in the line of the strike of the strata; but this is not universally the case, as, in some parts, particularly of the granite district of the county of Wicklow, and of insulated portions of that of the counties of Donegal and Down, the granite protrusion has cut across the strike of the strata; in which cases the ends of the stratified rocks, though much shattered and confused, are found to abut directly against the sides of the granite precipice.

The stratified rocks which rest on the north-west and south-east sides of the granitic nuclei, have been much altered by the contact of the incandescent granite at the time of its protrusion; and hence we find that strata which, within a short distance of the granite boundary, consist of clay slate, rapidly change their character, and pass into large-grained mica slate, or gneiss, and occasionally into hornblende slate, or hornblende rock, and several varieties of porphyry, in which large crystals of hornblende and felspar are fully developed.*

In addition to the granite, vast masses of protruded greenstone occur throughout the whole of the primary districts of Ireland, and in many cases they are interposed along the line of boundary, between the granite and the slate, and in some instances have forced their way through the granite itself; hence we may conclude that they are posterior to the granite; and, though generally classed among the primary rocks, there is reason in many cases to believe them to be more recent than the newest of the secondary.

With the exception of granite, which is used as a valuable building stone, and some inferior slate quarries which occur in different parts of the counties of Derry, Tyrone, and Donegal, and also in parts of the counties of Down, Kildare, and Wicklow, the only valuable rock, in an economical point of view, is primary limestone, which occurs in great abundance throughout the schistose districts of the counties of Donegal, Derry, Tyrone, and Galway. This substance is chiefly valuable as manure, when burned into lime; but in some districts the limestone beds occasionally produce beautiful varieties of crystalline marble, of various tints, as white, rose, and dove-colour; and in the county of Galway large quarries have been opened, containing a valuable kind of serpentine, striped and mottled, white and green, from which blocks of large dimensions have been raised.

The whole of these primary and transition schistose districts contain metalliferous veins; but a few only of those which are known, have been worked, and no doubt many yet remain undiscovered.

Owing to the great decrease in the prices of copper and lead during the last few years, many mines, formerly at work, have been abandoned; and at present no metallic mines are in operation in the north of Ireland, with the exception of one, containing lead, at Conlig, near Newtownards, in the county of Down, and another at Derrynoose, in the county of Armagh.

Of the numerous copper and lead veins known in the county of Wicklow, only four are at present at work, namely, the lead mines of Lugganure and Glenmalur, situated on the boundary of the granite and slate, and the copper

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similar to that of the western side of the granite; and if we follow the strata in a south-eastern direction, in the line of the dip, we soon find that the mica slate is succeeded by beds of clay slate and greywacke slate, similar to those of Rathcoole. Reasoning from analogy, we may infer that the mica slate, which rests on the granite on the east side, and which underlies the greywacke of Wicklow, is similar to the mica slate which forms the upper member of the greywacke series, on the west side; and, consequently, that the granite of the counties of Wicklow and Wexford, like that of the county of Down, has been protruded through a district of greywacke slate, and that the whole of the imperfectly crystalline rocks in contact with it, must be considered to be metamorphic.

* It occasionally happens, that schistose rocks, in the neighbourhood of, or even in contact with the granite, present no striking difference in composition or structure as compared with those at a distance from it, but, generally speaking, where the rock is clay-slate, its surface, when fractured in the direction of the cleavage, presents a brilliant, shining, or micaceous lustre, which is wanting at a distance; the joints, also, are more open; and the rock, when struck with the hammer, breaks into indeterminately angular fragments.

It may be observed, that localities in which the granite has not had the effect of altering the character of the schistose rocks in contact with it, are usually confined to small or insulated protrusions, similar to those of the county of Wexford; and hence we may be inclined to attribute the trifling effect produced on the schistose rock, either to the smallness of the volume of the mass, or that the granite itself was in a comparatively cool state at the period of its protrusion.

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Geological Structure of Ireland.

Transition Rocks.

mines of Ballymurtagh and Cronebane, in the vale of Ovoca, six miles to the west of Arklow.

The metalliferous relations of the counties of Wicklow and Wexford have been described in great detail by Mr. Weaver, in his valuable memoir, contained in the fifth volume of the *Transactions of the Geological Society of London*; it is consequently unnecessary to enter further on the subject in this place.

At present there are no mines working in the primary mountain districts of the counties of Leitrim, Sligo, Mayo, and Galway; but many, both of copper and lead are known, and have been worked at former periods with considerable success.

Hitherto no mention has been made of the great mountain tract which extends from Waterford, on the east coast, to Dingle Bay, on the west, and which comprehends the whole of the county of Waterford, and large portions of the counties of Cork and Kerry.

This district contains two varieties of slate, and abundance of carboniferous or mountain limestone; the latter occurs in the valleys of all the principal rivers, and its several localities are distinguished on the map from the slate by the blue colour.

The older transition slate of this district, which is coloured grey, is similar in age, as well as in composition and structure, to that of the counties of Down, Kildare, Wicklow, and Wexford; it contains abundance of dark grey roofing slate, which is successfully quarried at Glenpatrick, in the county of Waterford, and at West Carberry, in the county of Cork.

The second, or newer slate, usually rests unconformably on the older. The lower portions of its strata consist of alternating beds of brownish-red quartzose conglomerate, and coarse red slate. These strata are succeeded by alternations of red and grey quartz rock, red quartzose slate, and clay slate, the grain becoming gradually finer as the beds accumulate and recede farther from the conglomerate, till at length the upper beds produce varieties of purple, brownish-red, and reddish-grey clay slate, which are quarried and used as roofing slate, particularly in the valley of the river Blackwater, near Lismore.[*] In the counties of Waterford and Cork these strata form successive undulations, the ridges of which have an east and west direction, and the beds always incline towards the valleys of the principal rivers, and thus form troughs, which are filled by indurated sandstone, and secondary limestone, whose strata rest conformably on the clay slate.[†]

The southern clay slate district contains several copper and lead mines, of great value, some of which are now being worked on an extensive scale, and with signal success, particularly those of Knockmahon, in the county of Waterford, and of Allihies, near Berehaven, in the county of Cork. Mining operations have lately been commenced, with great spirit, at Ardtully, near Kenmare, in the county of Kerry; and extensive works have, till within a short period, been carried on at the Audley Copper Mines, near the southwestern coast of the county of Cork.

In the county of Tyrone, immediately to the east of the village of Pomeroy, there is a small tract composed of grey micaceous slate, which varies from coarse to fine-grained; it rests directly on the sienitic granite, situated to the north, and is covered unconformably on the south, west, and east, by old red sandstone.

This slate contains a profusion of organic remains, consisting chiefly of numerous varieties of *Trilobites*, with *Orthoceras*, *Ammonites*, *Producta*, *Spirifera*, *Pleurotomaria*, *Mya*, *&c.*; it probably belongs to the silurian series.[‡]

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[*] The newer slate series, above described, contains, in some localities, abundance of marine, and even vegetable organic remains; but, as yet, their species, excepting a few terebratulæ, have not been determined. It is possible that the whole may belong to the silurian system; but a careful examination of the district will be required before this point can be satisfactorily determined.

[†] The limestone of the vallies of the rivers Lee, Bride, Blackwater, &c., contain all the fossils of the carboniferous limestone; and the grey slate, which sometimes alternates with the lower beds of the limestone, also contains fossils similar to those found in the limestone. The subjacent sandstone frequently contains calamites, and other vegetable remains, resembling those which occur in the coal formation. Hence, though in a questionable position, we must consider this limestone to belong to the secondary class; and it is colored as such on the Geological Map.

[‡] Captain Portlock, of the Royal Engineers, is now engaged in an investigation of the organic remains of this district; and a detailed description of them will, no doubt, be presented to the public, in the Memoir of the Ordnance Survey of the county of Tyrone.

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Transition Rocks.

In addition to the primary and transition mountain districts, already described, which occur on the sea coast, nearly surrounding the island, there are several mountain ranges in the interior, which are insulated in the flat secondary limestone country, and which are composed, partly of transition slate, and partly of overlying beds of old red sandstone. The most important of these ranges are the Curlew Mountains, of the county of Sligo, which consist altogether of old red sandstone, the Slievebon Mountains, in the county of Roscommon, the Derrybryan and Tullow Mountains, of the counties of Galway and Clare, situated on the west side of Lough Derg, on the Shannon; the Keeper, Devil's Bit, and Slievebloom Mountains, situated to the east of the Shannon, which extend through the county of Tipperary, and King's and Queen's Counties, and the Galties, and Slievenaman mountains of the counties of Limerick, Tipperary, and Kilkenny.

The whole of these detached mountain ranges have either an east and west, or north-east and south-west direction, parallel to the strike of the strata of which they are composed.

Secondary Rocks.

Of the Secondary Rocks.—Having, in the foregoing pages, described the whole of the mountains and mountain ranges of Ireland, we next proceed to the consideration of the great interior valley, which is entirely composed of secondary rocks, consisting of the old red sandstone, carboniferous limestone, and coal, and its accompanying strata.

The old Red Sandstone of Ireland usually consists of a base of conglomerate composed of rolled fragments of quartz, cemented by a brownish-red siliceous and ferruginous paste; the lower conglomerate beds are succeeded by strata, which gradually become fine-grained, and assume the character of compact brownish-red sandstone.

With the exception of the district of old red sandstone (coloured dark reddish-brown on the Map), which extends from Enniskillen, in the county of Fermanagh, towards Cookstown, in the county of Tyrone, this rock rarely occurs, except on the edges of the primary and transition districts, where it is interposed between the schistose strata and the rocks belonging to the secondary or carboniferous limestone, which succeed it. The different localities, in which these strata occur, will at once be seen by reference to the Geological Map, and, consequently, it is unnecessary to particularize them.

The old red sandstone is succeeded by strata belonging to the carboniferous limestone series, which rocks occur more abundantly in Ireland than those of any other class. On looking to the Geological Map, the prevalence of the blue colour, which, in its various shades, indicates the positions of the several strata belonging to that series, will be at once apparent; in fact, it forms the surface rock of nearly two-thirds of the island.

In England the carboniferous limestone is generally known by the name of the mountain limestone, from its occurring in mountainous, or comparatively elevated regions. In Ireland, on the contrary, with the exception of the northern portion, the country composed of carboniferous limestone is unusually low and flat, and where any eminences occur, they are found to consist either of older rocks, of igneous protrusions, or of vast accumulations of diluvial gravel.

Subdivision of the Limestone Strata.

Subdivision of the Strata.—Though the carboniferous limestone is very extensively distributed over the surface of Ireland, still the entire succession of its strata is rarely developed in any particular district, one or more members of the series being usually wanting in each locality.

As far as our present knowledge extends, the following, in an ascending series, appears to be the order of succession of the different groups or assemblages of strata belonging to each period of deposition:—

1st. Yellow Sandstone, Limestone, and Shale.

2nd. Lower Limestone.

3rd. Impure Argillaceous Limestone, called *Calp*, Black Shale, and Sandstone.

4th. Upper Limestone.

It is probable, when more detailed examinations shall have been made of the fossil remains contained in each of these groups, we shall discover types leading to a more perfect classification. In the mean time we must be satisfied with one which is derived solely from the observed variation in the mineral character or composition of the strata, as they succeed each other.

Yellow Sandstone.

Yellow Sandstone.—The lowest member of the series usually consists of quartzy sandstone conglomerate, which varies from coarse to fine-grained, and passes into sandstone.[*] In some instances, though rarely, this conglomerate contains rolled masses of carboniferous limestone ; it is usually followed by a succession of strata, consisting of yellowish-grey or yellowish-white sandstone, which, when fully developed, amounts to a considerable thickness, and occasionally forms hills of moderate elevation. The yellow sandstone strata are sometimes free from the intervention of any other rock, but frequently its beds are interstratified with dark grey shale and with dark grey limestone, more or less pure. In some localities very thin beds of impure coal occur interstratified with the sandstone and shale ; a circumstance which has unfortunately led to many expensive but fruitless trials for coal in different parts of Ireland ; and one is at this moment in progress.[†]

The average thickness of this system may be about 600 feet, though in some instances its strata exceed 1000 feet in thickness.

The yellow sandstone beds usually succeed the old red sandstone, and where it is wanting (which frequently happens,) they rest upon primary or transition rocks. Hitherto the lower conglomerate and sandstone members of this series have been considered to belong to the old red sandstone ; but as in several localities these strata are found to alternate with beds of limestone, containing the fossil organic remains of the carboniferous limestone, it becomes evident that they form a portion of that series.

The localities of the yellow sandstone may be ascertained by reference to the Geological Map, and being the lowest portion of the series, they will be found on the exterior edges of the carboniferous limestone, near the contact with the old red sandstone ; or, where it is wanting, with the inferior strata.

In the interior of the great carboniferous limestone district of Ireland, there are several insulated ridges and hills, of moderate elevation, composed of this sandstone. The strata are sometimes coarse, and pass into conglomerate, but they are usually fine grained, and the upper beds alternate with impure limestone. The direction of the ridges is usually north-east and south-west, parallel to the general strike of the primary and transition slates of the country, and being formed in each case by an undulation or upheaving of the strata, the sandstone beds dip on all sides towards, and pass under the surrounding limestone.[‡]

Lower Limestone.

Lower Limestone.—We next proceed to the consideration of the second division, or lower limestone, which forms by much the most extensive portion of the series in Ireland. In the northern counties of Fermanagh, Cavan, Leitrim, and Roscommon, it is in part covered by the upper division of the series ; but in the midland and southern counties, with the exception of the Calp Valley of the counties of Dublin, Meath, and Westmeath, it forms the surface rock throughout the greater portion of the limestone country.

The undermost beds of the lower limestone are frequently silicious and impure, and graduate insensibly into the alternations of sandstone, shale, and limestone, which form the upper portion of the yellow sandstone series. The colour is usually dark grey, or bluish-grey. In many localities, as the beds accumulate they become black, and the structure is occasionally so crystalline as to be susceptible of a high polish, and is used for marble ; thus black marbles occur, and are quarried very extensively near the western boundary of the limestone district of the county of Galway, between Oughterard and Lough Corrib ; also near the town of Galway, and thence to Oranmore.

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[*] Thus we have three distinct conglomerates, viz.:—1. That of the newer transition series. 2. The conglomerate of the old red sandstone. 3. The yellowish-grey conglomerate of the yellow sandstone.

[†] At Latt, one mile north of the town of Cavan, a boring is now being made in search of coal, through the alternating beds of sandstone, shale, and limestone, close to the boundary of the greywacke district, and consequently through the lowest strata belonging to the carboniferous limestone series.

[‡] Among the most remarkable of these detached ridges, we may enumerate that which extends from Lough Gara, in the county of Roscommon, to Swineford, in the county of Mayo. The Slieve Dert Mountains, situated to the north of Dunmore, in the county of Galway ; as also Mount Mary, and the sandstone district of Castle Coote, situated on the banks of the River Suck ; the hills west of Castlereagh, in the county of Roscommon ; the ridge round the town of Longford, and Slieve Galry, in the county of Longford, and the sandstone district of Moate-a-Grenogue, in the county of Westmeath. The whole of these sandstone ridges and hills have been heretofore considered to belong to the old red sandstone period, but, for the reasons already adduced, they are now considered to belong to that of the carboniferous limestone.

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Lower Limestone.

Black marble occurs under similar circumstances in the neighbourhood of Westport, in Mayo, and of Carlow and Kilkenny; also, mottled black and white, in the neighbourhood of Mitchelstown, at the base of the Galtees Mountains; likewise, filled with organic remains, in the neighbourhood of Cork, and many other places. Where carbon, the colouring matter, is wanting, we have crystalline marble of various tints, as brownish-red, at Armagh; white and red striped, at Killarney, Kenmare, Cork Harbour, and Castletown, nine miles north of Nenagh, county Tipperary; red, and yellowish white, at Clononey, in the King's County, and brownish-red, mottled with grey of various shades, at Ballymahon, in the county of Longford. Grey and dove marbles occur in numerous places, particularly at the base of the Curlew Moutain, near Lough Arrow, in the county of Sligo; near the Seven Churches, south of Athlone, in the King's County, and at Carrickacrump, near Cloyne, in the county of Cork.

By reference to the Geological Map it will be seen that nearly the whole of the marble quarries here mentioned, dispersed as they are from north to south, occur near the outer edge of the limestone boundary, where it rests either on the yellow sandstone, or on some older rock. When they are met with in the interior, as at Clononey and the Seven Churches, in the King's County, it will be seen that detached hills of yellow sandstone, as already described, rise up from beneath the limestone strata, in their immediate neighbourhood; thus showing that the marble beds do belong to the lower portion of the series.

The marble beds are succeeded by strata of grey or greyish-blue limestone, which occupy a greater or less extent of country, in proportion as the strata effect a steep or slight angle of inclination from the horizon. In many cases the strata undulate, forming very flat curves; and where such occur, of course, the same bed may frequently be met with at the surface, throughout a large district.

Excepting in the northern counties, where the succession of the limestone series is fully and clearly developed, it is almost impossible to determine, with any precision, on the point where the lower limestone may be said to terminate, and the *calp*, or the upper limestone, to commence. In many localities of the midland and southern counties, the black shale or calp series, is altogether wanting, or it occurs so sparingly, that without a laborious and minute examination, it will not be detected.

With the exception of the trap protrusions and the insulated hills of yellow sandstone, already described, the strata belonging to the lower limestone series occupy the greater part of the limestone districts.

Calp, or Black Shale Series.

Calp, or Black Shale Series.—The name Calp was given by Mr. Kirwan to the black argillaceous limestone of the neighbourhood of Dublin, which alternates with black shale, and contains flattened spheroids of pyritous clay iron stone. In some districts the lower beds of this series consist of alternations of sandstone, shale, and limestone, more or less pure; in others the sandstone is wanting, but the upper beds in all consist of thin alternating beds of impure limestone and shale. In some localities the lower beds, in addition to the sandstone and shale, contain indications of carbonaceous matter; and impure beds of coal, varying in thickness from half an inch to two inches have been observed; which circumstance, as in the case of the yellow sandstone, has led to many fruitless trials for coal.

The thickness of the calp series, where fully developed, is very considerable; on the north-west coast of the county of Leitrim, it exceeds 1,700 feet, though in the county of Cavan, between Belturbet and Ballyconnel, it is not more than 400 feet.

In some districts the upper members of the lower limestone alternate with beds of dark bluish-grey shale, and thus graduate so imperceptibly into the calp or black shale division, that it is impossible to draw a precise line between them, while in others the division is so distinctly marked, that the boundary may at once be clearly defined. In flat countries where the gradation is usually insensible, the first decided indication is the occurrence of beds of black shale, containing balls or flattened spheroids of clay ironstone; these beds are usually interstratified with the black or dark bluish-grey argillaceous limestone, similar to that which occurs in abundance in the neighbourhood of Dublin.

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Calp, or Black Shale Series.

This division is much more fully developed in the northern districts of the carboniferous limestone, than in the midland or southern; and it was solely from the clear exhibition of their strata, as seen in the precipitous cliffs of the remarkable carboniferous mountain district of the counties of Sligo, Fermanagh, Cavan, Leitrim, and Roscommon, that the sub-division of the series has been attempted.

This district which is unique in Ireland, and which bears a striking resemblance, in character as well as composition, to the carboniferous mountain districts of Derbyshire, north-west of Yorkshire and Cumberland, exhibits in perfection the whole of the carboniferous limestone, as well as the millstone grit series of Ireland.

The calp and shale division is, perhaps, best developed on the west coast of the counties of Leitrim and Sligo, between Ballyshannon and Benbulben. In this line of section the strata dip to the southward, at an angle from 2° to 5° from the horizon. The lower limestone of Ballyshannon is succeeded by beds of black shale, containing balls of clay ironstone, interstratified with impure argillaceous limestone; these beds continue as far as the parallel of Bundoran, where they are succeeded by a series of alternations of grey and occasionally reddish grey sandstone and black shale, with argillaceous limestone. Some of the sandstone beds contain casts of calamites enveloped in coaly matter; and some thin but irregular beds of coal have been observed, though none worth working have been discovered, and from the nature of the country it is improbable that any such do exist. These beds are succeeded by alternations of black shale, with impure argillaceous limestone, or calp, which form the precipitous cliffs of Dartry mountain facing the west, and which, near the summit, are capped by the upper or splintery limestone.

In examining the succession of the calp strata in a western direction, commencing with the lower limestone at Belturbet, in the county of Cavan, and crossing Slieverushen, the valley of Swanlinbar, and Cuilcagh Mountain, an important member, namely, the grey sandstone with coaly impressions, &c. is wanting, or at least very slight traces of it can be discovered; a circumstance which proves that considerable variations may be expected in the composition, as well as in the thickness of the same division of the carboniferous limestone series, even within the same district or neighbourhood; and hence we need not be surprised to find in some of our carboniferous districts, that the calp division is altogether wanting, and in others that it is only slightly developed. It would be tedious, and almost endless to enter upon a particular description of the numerous localities in which the calp series occurs in the north of Ireland; at present we need only observe, that the shale district, extending from Emyvale in the county of Monaghan, to Brookborough in the county of Fermanagh, known by the name of the Slieve Beagh mountains, has long been considered to belong to the true coal formation, and sanguine expectations have been entertained of the discovery of workable beds of coal; but having ascertained, that in the order of succession it forms a portion of the calp series, it appears very improbable that these expectations will be realised.

The calp district of Leinster, if it may be so called, which extends through the counties of Dublin, Meath, and Westmeath, is composed of alternations of impure black argillaceous limestone, with black shale, containing balls of clay ironstone. Some of the shale beds which are much impregnated with sulphuret of iron, are, no doubt, the sources of the numerous chalybeate, as well as sulphureous springs which occur in that district.

In the neighbourhood of Dublin, the calp shale rarely contains any organic remains, while in other localities they are very abundant, particularly in varieties of *Producta*, *Spirifera*, *Terebratula*, *Crinoidea*, both heads and stems, together with various *Corallines*, and particularly a large variety of *Turbinolia*, probably *Turbinolia fungites*.

Upper, or Splintery Limestone.

Upper, or Splintery Limestone.—This rock is comparatively of rare occurrence in Ireland, and its superficial extent is insignificant. Owing to its containing the greater number of the fossil organic remains which occur in the lower limestone, it is difficult in some localities to distinguish between them, particularly where the calp series is wanting, which frequently happens.

A country composed of the upper limestone is usually extremely rugged, and contains numerous crags and mural precipices, which at a distance pre-

Upper, or Splintery Limestone.

sent the character of rude columnar façades; it is usually cavernous, and the streams falling from higher elevations, are frequently lost in fissures, and flow through subterranean channels, till at length they burst forth from the lower strata of the series, and flow down the more gentle declivities of the calp shale beneath them.

The rock is commonly of a light smoke-grey, or bluish-grey colour; the fracture is splintery in one direction, and conchoidal in the other; the texture is even and close grained; frequently the mass is extremely brittle, and breaks into indeterminately angular fragments; the upper beds contain much black and grey hornstone, arranged in regular or undulating layers; they occur also in detached elliptical masses.

Strata belonging to the upper limestone are well exposed to view, in the precipitous sides of the carboniferous limestone mountains already so frequently alluded to, of the counties of Sligo, Fermanagh, Cavan, and Leitrim. The general character of the rock is similar throughout; every precipice presents at a distance the same semi-columnar aspect, is of the same grey colour, breaks with the same splintery and conchoidal fracture, and abounds with the same fossil organic remains; the lower beds consist of the same alternations of dark grey limestone with thin beds of shale; and the upper contain the same layers and detached masses of black and grey hornstone.

The upper strata of the series are frequently associated with irregular beds of semi-crystalline brown spar rock, the exposed and disintegrated surfaces of which so much resemble ordinary grey sandstone in appearance, that this rock has frequently been mistaken for it. Thus brown spar of this kind occurs in the upper limestone, on the summit of Knocknaree Mountain in the county of Sligo, in a similar position on Belmore Mountain in the county of Fermanagh, and in many other localities.

In Belmore Mountain the thickness of the upper limestone amounts to 650 feet, in Benbulben it is 500 feet, and at the eastern base of Cuilcagh Mountain, in the valley of Swanlinbar, in the county of Cavan, it is 600 feet.

Leaving the Lough Allen mountain district, the next locality in which the upper limestone occurs, is in the vicinity of, and surrounding the coal formation of the county of Tyrone; commencing at Dungannon, it extends towards Stewartstown, and thence underlying the small coal field of Annabone, north of Stewartstown, it continues by Killymoon to Cookstown, in which neighbourhood it is covered by strata belonging to the new red sandstone.

The quarries at Cookstown are remarkable for the number and variety of fossil organic remains which they contain; and it is to be observed, that almost every species and variety which occur there, have likewise been discovered low down in the series of the lower limestone, particularly in the quarries in the parish of Clane, near the Grand Canal, in the county of Kildare, and in the valley of the River Lee near the city of Cork.

It is probable that the upper limestone does not occur in any portion of the great midland limestone district of Ireland; the first position in which it occurs, and where it presents the usual characters of the series, is surrounding the Leinster and Tipperary coal districts, in the Queen's County and the counties of Carlow, Kilkenny, and Tipperary.

In the valley of the Barrow at Carlow, where the whole carboniferous limestone series of the south is clearly developed, it would appear that the calp, or black shale division is wanting; and that the upper limestone rests directly on the black marble beds of the lower.

The upper limestone of the Queen's County and the county of Kilkenny, is characterised by the number and size of the caverns it contains, the most remarkable of which are the Great Cave of Dunmore, situated on the edge of the Leinster coal district, eight miles north of Kilkenny; and of Clopooke, five miles south of Stradbally, in the Queen's County.

The upper limestone also occurs, underlying the anthracitous coal district of the counties of Clare, Limerick, Kerry, and Cork. Its distinctive characters are clearly developed at Foynes, adjoining the River Shannon, in the county of Limerick, close to the eastern boundary of the coal country. In this locality the strata present numerous mural precipices, and the upper beds contain in abundance, layers and insulated masses of hornstone. Organic remains occur, though less abundantly than usual; but no dependence can be placed on them, owing to their being common to the lower as well as to the upper series. It is doubtful whether or not the upper limestone occurs in the

Geological Structure of Ireland.

Upper, or Splintery Limestone.

valley of the river Blackwater, along the southern boundary of the Cork coal district, and from thence westward to Killarney; in that direction the strata are so much disturbed, that it is nearly impossible to determine either the dip or strike. It seems probable that the strata of the coal formation rest unconformably on the lower limestone; that the upper is wanting in the valley of the river, and that the unusual disturbance and derangement of the strata have been occasioned by a fault occurring in the line of the bed of the river, which for the most part forms the boundary between the limestone and the coal formations.

As the boundaries of the different series into which the limestone has been divided, have not yet been accurately traced, no attempt has been made to designate their respective localities on the map by distinguishing colours.

The carboniferous limestone of Ireland, contains several igneous protrusions, consisting of varieties of greenstone, greenstone porphyry, and other rocks belonging to the trap formation, which at present it is unnecessary to particularize.

The localities of the most remarkable protrusions are Croghan Hill, in the King's County; the Hill of Allen and Grange Hill in the county of Kildare; and Knockgraney, Kilteely, Cahirconlish, Knockferna, and many others in the county of Limerick, whose respective situations are marked by distinguishing colours on the geological map.*

Millstone Grit.

Millstone Grit.—Rocks decidedly belonging to this series, are only met with in the mountain district surrounding Lough Allen in the counties of Roscommon, Leitrim, Cavan, and Fermanagh, hitherto known by the name of the Connaught coal district; and in the shale district, extending from Drumquin, in the county of Tyrone, to the neighbourhood of Pettigoe, in the county of Fermanagh. Both these districts contain coal, and on this account they have hitherto been considered to belong to the true coal formation; but being in many respects analogous to the millstone grit of the north of England, as described by Professor Sedgwick and Professor Phillips;† and as it contains the remains of marine exuviæ, which occur from the lowest to the uppermost beds of the series, there can be no hesitation in considering it to belong to a different class, from that of the true coal formations of Ireland.

In order to place the succession of the strata, which compose the millstone grit of Ireland, in a clear point of view, it will be necessary to describe the sections as they occur in those localities where each portion of the series is most clearly developed. We shall commence with Cuilcagh Mountain, situated to the west of the valley of Swanlinbar, already mentioned.

The splintery limestone which forms the upper member of the carboniferous or mountain limestone series, is succeeded by three great beds, or successions of beds of yellowish-white quartzy sandstone, having beds of black shale interposed between each.

In ascending Cuilcagh Mountain from the east side, these sandstone beds present a succession of terraces; and the shale beds between them assume the appearance of comparatively flat swampy plains; the thickness of the whole amounts to about six hundred feet. They are succeeded by what may be termed the great shale of Cuilcagh Mountain, whose aggregate thickness exceeds 700 feet. The lower beds consist of thin alternations of black shale with impure dark bluish-grey argillaceous limestone, which contain many of the fossils common to the carboniferous limestone series. Continuing to ascend the mountain, the calcareous beds gradually diminish in thickness, and at length entirely disappear; but in lieu of them, the shale beds are associated with numerous and frequently thick layers or beds, and also with large flattened spheroids, of argillaceous ironstone, some of which are extremely rich in iron,‡ and were formerly worked. Many of the flattened ironstone spheroids are extremely large, and some, which are reticulated by veins of calcareous spar, present magnificent specimens of septaria.

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* The above-mentioned protrusions, together with the trap conglomerates which accompany them, present many peculiarities well worthy of particular description and discussion; but such detail would be quite unsuited to the objects of this outline.

† Transactions of the Geological Society of London, second series, vol. iv., part 1; and Geology of Yorkshire.

‡ Within the last century many small iron works or bloomeries, were carried on in the Valley of Swanlinbar. The ironstone was procured from Cuilcagh Mountain, and the fuel from the woods, which at that time overspread the neighbouring country, but of which few traces now remain.

Appendix. No. I.

Geological Structure of Ireland.

Millstone Grit.

The shale which accompanies the ironstone contains a profusion of casts of marine organic remains, many of which differ from those of the subjacent limestone ;* and it is this circumstance which has induced the classification of the strata which immediately succeed the upper limestone, with the millstone grit series, in preference to that of the carboniferous limestone.

Still continuing to ascend, the ironstone beds become thin, and at length disappear; and the upper portion, amounting to a thickness of about 250 feet, consists altogether of fine grained black shale, containing organic remains, but particularly of *Possidonia*, but not so abundantly as in the lower beds, which alternate either with the impure limestone or the ironstone.

This great mass of shale is succeeded by an accumulation of beds of yellowish-white sandstone, about 250 feet in thickness. In the lower portion, next the shale, the sandstone beds are thin, and alternate with sandstone, slate, and shale; the upper consists of thick beds of yellowish-white quartzy sandstone, some of which are rather coarse grained, and assume the true character of millstone grit.†

This rock occasionally contains vegetable organic remains, particularly some varieties of *Stigmaria*. In this portion of the district, the remarkable table land, which forms the summit of Cuilcagh Mountain, and which is elevated 2,188 feet above the level of the sea,‡ forms the upper member of the millstone grit series; but if we cross the valley of Lough Allen, in a south-western direction to the Arigna Iron Works, we find the same rock resting on the same shale, near the summit of Brahlieve Mountain, in the county of Roscommon; from this point we can continue the description of the section.

The millstone grit of Brahlieve Mountain is succeeded by alternations of shale and sandstone, with three beds of coal, one of which in this mountain is three feet in thickness, though in others the same bed is less than two feet thick; but, unfortunately, the extent of this coal field, which is confined to the summit of Brahlieve and Slieve Kurkagh Mountains,§ is so inconsiderable, that no extensive collieries or manufactories can be successfully established, consequently we cannot expect that this district will at any period produce an abundant supply of fuel for distant markets. At present, the Arigna Iron Works (the only manufactory of that kind in Ireland,) are in full work, and cast iron of the best quality is now made there at a moderate expense. The coal, though thin, is of excellent quality, as far as regards the smelting of iron; the ironstone is peculiarly rich, and limestone is abundant in the neighbourhood; and it is to be hoped that these works, on which public expectation has been so often raised, and as often disappointed, will at length become profitable to the speculators, as well as advantageous to the labouring population of the surrounding district.‖

The millstone grit forms the summit not only of Cuilcagh, but of many similar mountains of the neighbouring district. Had they been one hundred feet higher, they would have all contained the main coal of Brahlieve

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* Among others, a peculiar variety of *Possidonia*, and some varieties of *Ammonites*, *Goniatites* and *Orthoceras*; the same variety of *Possidonia* occurs throughout the whole of the series, above as well as below the coal.

† Excellent millstones are procured from the summit of Cuilcagh Mountain; but owing to the difficulty of transporting them from so inaccessible a situation the number is not great.

‡ Ordnance Survey.

§ The detail of the succession of the strata, in a descending series from the summit of Brahlieve down to the millstone grit, is as follows :—

	Feet.	Inches.
Black Shale, containing *Asaphus, Orthoceras, Productæ, Spiriferæ, Possidonia, &c.*,	150	0
Sandstone, with a thin bed of Coal,	24	0
Shale,	15	0
Bituminous coal of good quality, used in smelting iron at the Arigna Iron Work,	3	0
Sandstone,	12	0
Shale,	6	0
Sandstone,	9	0
Coal, mixed with Shale, called the Crow Coal,	1	0
Coal Seat,	1	0
Sandstone,	7	0
Black Shale,	20	0
	248	0
Millstone grit, the same as at Cuilcagh Mountain,	100	0

‖ The Arigna Company are in possession of the most extensive and valuable coal fields of the district.

Appendix. No. I.

Geological Structure of Ireland.

Millstone Grit.

Mountain; but, unfortunately, that valuable coal bed, which, no doubt, once existed there, has been washed away by the action of currents proceeding from the north-west, and deposited in broken fragments, accompanied by sandstone and blue clay, on the surface of the limestone valley which extends to the south-east, towards Belturbet, Killeshandra, and Mohill. In many instances, large pieces of coal have been discovered by well sinkers, in the diluvium throughout the district above mentioned; and in some cases, the quantity of coal was so considerable as to induce the belief that by sinking deeper a bed of coal might be found.

In the millstone grit district, which extends from the neighbourhood of Drumquin, in the county of Tyrone, towards Lough Erne, in the county of Fermanagh, the series is very imperfectly developed. It also contains coal, but the beds are too thin and impure to repay the expense of working.

OF THE COAL FORMATIONS.

Coal Formations.

Independently of the millstone grit, Ireland contains six coal districts, which appear to belong to a distinct formation from it, though doubts may be entertained whether the whole are not fully as ancient and some perhaps more so than the millstone grit.

With the exception of the coal field of the county of Antrim, the whole of the coal districts of Ireland rest upon the upper or splintery limestone; and in this respect their position is similar to that of the millstone grit. The difference consists in the latter containing abundance of marine exuviæ, while in the true coal formation we find casts of terrestrial plants, and of fluviatile, or lacustrine remains.

The coal districts of Ireland contain two distinct species of coal, namely, simple carbonaceous, or stone coal, with its accompanying anthracite, or culm, and bituminous, or blazing coal; the first, with the exception of two small beds of trifling importance which occur in the Antrim coal district, are confined to the coal districts situated to the *South of Dublin;* while the *northern* contain bituminous coal.

The southern coal districts consist of the Leinster, the Slieve Arda, or Tipperary, and the Munster; and the northern, of the Monaghan, the Tyrone, and the Antrim.

Leinster Coal District.

The Leinster Coal District.—We shall commence our review with the Leinster coal district, which is situated in the counties of Kilkenny, Carlow, and Queen's County.

The well known property of Kilkenny coal, namely, that of burning slowly without either flame or smoke, has obtained for it, among mineralogists, the name of non-flaming coal. It is also called mineral charcoal from its containing from 94 to 96 per cent. of pure carbon.

The strata which compose the Leinster coal district, consist of alternations of shale, with argillaceous ironstone, both in layers and spheroids, compact quartzy sandstone, and sandstone slate; they are arranged in the form of a great mineral basin, and all the strata dip, or incline from the edge towards the centre of the basin, and consequently the undermost strata appear on the outer edge, and the uppermost in the interior of the district.

This district contains seven workable beds of coal, arranged in regular succession, one above the other. The collieries, particularly those in the neighbourhood of Castlecomer, in the county of Kilkenny, and of Doonane, in the Queen's County, have been worked for upwards of a century, and now annually produce about 120,000 tons of coal and culm. The coal is used for domestic purposes and malting, and the culm exclusively for burning lime.

The upper beds, which are the purest, being nearly free from sulphur, are now nearly exhausted; but three of the lower beds, which are very extensive, have never been worked, excepting where they occur near the surface, and, consequently, this district still contains an abundant supply of coal and culm.*

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* Descriptive section of the coal beds of the Leinster district, in an ascending order:—

1. The first or lowest bed of coal occurs at the height of 800 feet above the limestone substratum, the intermediate space being occupied by alternations of sandstone, sandstone slate, shale, and clay ironstone. This bed is little more than one foot in thickness, and has never been worked.

2. The second is divided into two parts, each one foot in thickness, by a bed of fire-clay. It is of

Slieve Arda, or Tipperary Coal District.

The Slieve Arda, or Tipperary Coal District.—The general circumstances of this district, are similar to the Leinster. It forms a ridge of hill country of considerable elevation above the limestone which surrounds it, and on which it rests.

Generally speaking, the strata of this district dip at a steeper angle from the horizon than those of the Leinster district, and they form frequent undulations; hence the coal occurs in deep troughs, and for that reason in the best regulated collieries the engine pit has been sunk in the centre of the trough, and the coal wrought by working upwards on both sides of it.

This district, as far as it is at present known, appears to contain but three beds of coal, the lowest of which is but nine inches in thickness, and the second and third are each two feet thick. The coal is of good quality, but not so dense as the three foot coal of the Leinster district.

The principal collieries are situated at Colehrook, and at Coolquil in the neighbourhood of Killenaule. The latter is conducted with judgment and considerable success by the Mining Company of Ireland. The large coal of this, as well as of the Leinster district, is used for domestic purposes and for malting, and the small coal and culm for burning lime.

Munster Coal District.

The Munster Coal District.—This district is, perhaps, the most extensive in the British empire; it occupies considerable portions of the counties of Clare, Limerick, Kerry, and Cork; and coal mines have been discovered, and partially worked in all those counties.

The strata of this district present the same undulatory arrangement as the Tipperary, and, consequently, the coal occurs in similar troughs. The strike in the interior of the district, is nearly east and west; and the dip is either to the north or south, at angles varying from 45° to 85° from the horizon, and sometimes they are quite vertical.

The coal is usually of a slaty structure, and much softer than that of Tipperary or Kilkenny; in consequence, it is almost exclusively used for burning lime.

In the county of Clare beds of anthracite, or slaty coal, have been discovered at Moy and Seafield, on the west coast, and on the banks of the Shannon near to Labasheda Bay, where considerable workings have been made, though the bed of culm is only 14 inches in thickness.

Thin beds of culm have also been worked in the neighbourhood of Loughill and Newcastle in the county of Limerick; and in the vicinity of Tralee and Listowel, in the county of Kerry; but the barony of Duhallow, in the county of Cork, contains the thickest and most valuable coal beds of the Munster district. The principal collieries are situated on the north bank of the river Blackwater; and at this moment extensive works are being carried on, particularly at Dromagh and Gurteen collieries.

Owing to the undulatory disposition of the strata, it is difficult to ascertain the number of distinct beds of coal which occur in this district, as the same beds frequently occur at the surface, on the opposite sides of each undulation. Six distinct beds can clearly be distinguished, partly by the thickness and peculiarities of each, and partly by the composition of the strata which accompany them. The three most valuable of these beds, known by the

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a very slaty nature, particularly the lower part, which divides into thin flakes, called *kelves* by the miners; it has been worked in many places where it was found near the surface, but from unskilful management, and a dread of the expense of sinking deep pits, and drawing up the water, the greater part of the coal still remains unwrought.

3. The third bed of coal is very similar to the second; it is, however, rather thicker and more solid. This has also been worked in a few places, but not to any considerable depth.

4. The relative situation of the fourth, with respect to the other beds of coal, has not yet been clearly ascertained; it is a very irregular bed and of variable thickness; it is usually composed of four feet of solid coal, and two feet of slaty coal. This bed has been discovered in many parts of the interior of the district; it is certainly of great extent, and at this moment its judicious working has become a matter of great importance to the surrounding neighbourhood, as the three foot bed of coal which occurs probably at the height of about 50 fathoms above it, and which has supplied the principal demands of the country for above a century, is now nearly exhausted.

5. The four foot coal is succeeded by a bed of coal one foot in thickness, and this by the three foot coal above-mentioned. Over the latter there were originally two beds of coal, one two feet in thickness, and the other three feet; but as these beds have been long since wholly exhausted, it is unnecessary further to allude to them. For additional information on this district, see *Griffith's Geological and Mining Report of the Leinster Coal District*, published by the Royal Dublin Society, in the year 1814.

Munster Coal District.

names of the Bulk vein, the Rock vein, and the Sweet vein,* have already been recognised on the opposite sides of three of the undulations; and it is probable that many of the detached beds which have been discovered and worked, both to the north and south of the known undulations, belong to others which have not yet been clearly traced.

From the extent of coal already known in the southern portion of the Munster coal district, no doubt can be entertained of its capability of supplying the country with abundance of culm suitable for burning lime for centuries to come. This circumstance is of the utmost importance to the agriculturists of the south of Ireland, who find lime to be the best manure for raising corn crops, and particularly wheat, the cultivation of which has been only introduced into that district within the last few years.

Monaghan District.

The Monaghan District.—We now proceed to the consideration of the bituminous coal districts, situated to the north of Dublin, and shall commence with that of Carrickmacross, in the county of Monaghan.

In this locality the coal formation rests on a small tract of carboniferous limestone, which is insulated in the central Greywacke slate district. Hitherto, though many trials have been made, no coal worth working has been met with; but one bed of 14 inches, one of 1 foot, and several of inferior thickness have been discovered.

Tyrone Coal District.

Tyrone Coal District.—This district, which is situated to the north of Dungannon, in the county of Tyrone, though very small, is much richer —that is, it contains a greater number of valuable beds of coal—than any other in Ireland. At present nine workable seams are known, which vary from three to nine feet in thickness. In this district, as well as in all the others, the limestone substratum is succeeded by a succession of black shale, with argillaceous ironstone, and occasional beds of sandstone; the whole series amounting to a thickness of about 500 feet. The first or lowest bed of coal which succeeds it, and which has been worked at Drumglass colliery, one mile north of Dungannon, is slaty and impure, and varies from two to three feet in thickness. Above it is a bed of coal four feet six inches thick, of excellent quality. Within the last 14 years very extensive workings have been made on this bed by the London Hibernian Mining Company; but, unfortunately, the speculation has not hitherto proved remunerative. The Company, however, still persevere, and it is to be hoped that their enterprise will at length be crowned with success.

At Coal Island, three miles north of Drumglass, six beds of coal have been discovered and worked with various success within the last century; and a very deep pit is now being sunk by the Coal Island Coal Company at Annagher, on the dip of the uppermost bed of coal, which is nine feet in thickness.† Unfortunately, the stratification of this district is so much disturbed and dislocated by faults, that the extent of coal commanded by each pit, is usually very much circumscribed; and this circumstance, when coupled with the soft and incoherent nature of the beds of shale and sandstone which accompany the coal, has added so much to the difficulty and expense of working it, that the mining adventurers have rarely derived any considerable profit.

The Tyrone coal district is bounded on the north-east by strata belonging to the new red sandstone formation, whose strata rest conformably on those belonging to the coal series.‡

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* Owing to the steepness of the angle (usually from 60° to 70°,) which the coal beds of this district make with the horizon, the mining operations are conducted upon the same system as those of metallic veins; and miners connected with metallic workings being usually employed, the coal beds have been called veins instead of seams, as is usual in other coal mining districts.

† The following Table shows the relative positions and thickness of the six coal beds at Coal Island in an ascending series:—

	Ft.	In.		Ft.	In.
1. Gorntnaskea, or Cannel Coal, which varies from - -	2	0	to	6	0
2. Derry Coal, from - - - - -	4	6	to	5	0
3. Baltyboy Coal, - - - - -	0	9	to	3	0
4. Brackaville Coal, - - - - -	4	6	to	5	0
5. Yard Coal, - - - - - -	2	0	to	3	0
6. Annaghor Coal, - - - - -	8	0	to	10	0

‡ At Annagher pit above mentioned, the miners sunk through 33 fathoms of new red sandstone before they reached the first bed of the coal formation, which consists of soft bluish-white clay stone, called white metal by the miners.

Geological Structure of Ireland.

Tyrone Coal District.

On the lands of Annaghone and Templerea, situated five miles to the north of Coal Island, a very small coal district, containing two workable beds of coal was discovered many years since, and extensive coal workings were made on the uppermost of these beds, which was nine feet thick and of excellent quality; but the coal field was so small, that the whole was soon wrought, and the works abandoned. Some trials have lately been made on the second or undermost bed, which is two feet in thickness, but not proving remunerative, they have also been abandoned.

The coal of the Tyrone coal district is very similar to that of Ayrshire. It burns swiftly, and leaves a considerable residuum of yellowish-white ashes.

Antrim Coal District.

Antrim Coal District.—This district is situated on the north coast of the county of Antrim, close to Fair Head, and occupies the country both to the east and west of that headland.

The collieries have been wrought at a very remote period, and possibly they may be among the most ancient of the British empire.*

To the west of Fair Head this district appears to contain but one workable bed of coal, which is four feet six inches in thickness. It is visible on the face of the magnificent cliff which extends westward from Fair Head nearly to Ballycastle; the strata dip to the southward at a small angle, and the coal has been wrought off by means of adits, or galleries, driven inwards from the face of the cliff, at the level of high water mark. As the coal generally crops out at a considerable elevation above the sea, some of these levels were driven upwards of 300 yards in length before they reached the coal on the dip.

At Murlough Bay, to the south-east of Fair Head, the strata which belong to the coal formation, appear to be quite distinct from those to the westward. Here, instead of one there are six beds of coal, varying from one to two feet six inches in thickness, four of which consist of bituminous coal, and two of carbonaceous or blind coal; but it is to be observed, that the latter beds occur one immediately above, and the other below an apparently intruded mass of columnar trap, seventy feet in thickness.†

The principal workings of Murlough Bay have been made on the two lower beds of bituminous coal, and the upper bed of blind coal.

At present no coal is raised in this district, owing partly to the difficulty of working to the dip of the old excavations, and partly from the want of a safe harbour for shipping the coal.

Upper Members of the Secondary Class.

The Upper Members of the Secondary Class.—The remaining rocks of the sedimentary class which occur in Ireland, consist of magoesian limestone, new red sandstone, black shale, lias limestone, green sand, and chalk.

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* A very extraordinary discovery, proving their great antiquity, was made about the year 1770; it is described in Doctor Hamilton's Letters on the Geology of the north coast of the county of Antrim. He states, that in working an unexplored part of the cliff near to Ballycastle, the miners unexpectedly broke into an old working, which was found to be very extensive, and wrought according to a regular system by persons who were evidently expert at their business. The implements discovered were different from those at present in use. No tradition now remains of the period or the persons by whom these mines were originally worked.

† TABLE of the SUCCESSION OF COAL STRATA, visible on the northern side of Murlough Bay, commencing from the top of the cliff.

	Ft.	In.
Columnar Greenstone, part of the upper range of Fair Head, about -	100	0
Brownish-red Sandstone, - - - - - - -	20	0
Bituminous Coal, - - - - - - - -	1	0
Red Sandstone, - - - - - - - -	80	0
Black Shale, - - - - - - - -	6	0
Coal, highly bituminous, (White Mine) - - - -	2	6
Brownish-red Sandstone, - - - - - - -	40	0
Highly bituminous Coal, - - - - - - -	0	6
Red Sandstone, - - - - - - - -	20	0
Black Shale, - - - - - - - - -	10	0
Bituminous Coal, (Goodman's Vein) - - - - -	2	6
Black Shale, - - - - - - - - -	60	0
Uninflammable carbonaceous Coal, - - - - -	2	6
Black Shale, passing into flinty slate, - - - - -	2	0
Second columnar range, - - - - - - -	70	0
Black Shale, - - - - - - - - -	2	0
Non-flaming Coal, alternating with thin beds of Black Shale, - -	8	6
Black Shale, thickness unknown, the face of cliff being covered by debris,	10	0
Total, - - - -	437	6

Geological Structure of Ireland.

Upper Members of the Secondary Class.

The whole of these comparatively recent strata occur in the north-eastern counties in the form of a great mineral basin, the upper beds of which consist of indurated chalk, capped by a thick mass of tabular trap, and the lower of new red sandstone, and, in one instance, of magnesian limestone.

This great mineral basin occupies nearly the whole of the county of Antrim, and considerable portions of the counties of Derry, Tyrone, and Down. Its external edge, when viewed at a distance, presents the striking feature of a high table land, rising precipitously either from a comparatively low and flat country, or from the level of the sea which bounds it on the north and east. Among the numerous characteristic examples which might be brought forward, perhaps the most remarkable are the lofty precipices and mural cliffs which extend along the east coast of the county of Antrim; from Belfast to Red Bay, in this direction, the same character prevails throughout, though some of the mountain headlands are more elevated and imposing than others.* The upper region of the cliffs presents, in all cases, mural escarpments, consisting of a mass of black trap, frequently from 200 to 300 feet in thickness; it is usually amorphous, but occasionally it is rudely columnar. The chalk which lies immediately beneath, also presents mural precipices, varying from 60 to 100 feet in height; and their dazzling whiteness, contrasted with the black mass of superincumbent trap, adds much to the general effect of the scene.

The strata beneath the chalk, which, in a descending order, consist of greensand, the lias formation, and red and variegated marls belonging to the new red sandstone, are usually concealed from view by a thick covering of clay and debris, which has arisen partly from the disintegration of the incoherent beds of lias, black shale, and red marl, and partly falls from the superincumbent cliffs of trap and chalk; consequently, the lower portions of the declivity, between the base of the chalk and the level of the sea usually present a steep inclined plane, many parts of which have been cultivated, and some so successfully, that they may be classed among the most productive soils of the north of Ireland.

Though the strata of the great northern mineral basin have, in a great degree, been altered or modified by the action of igneous matter, arising partly from the pressure of the great superincumbent mass of trap which covers the chalk, and partly by protrusions, consisting of trap veins or dykes, and occasionally of large mountain masses of trap, still the lithological character of the strata is sufficiently preserved to enable us to identify them; but, with the assistance of the fossil organic remains, which are abundant in the upper member of the series, no doubt can be entertained of the correspondence of these strata with similar successions of rocks in England as well as in other countries.†

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* The following elevations were taken from the Ordnance Survey:—

Fair Head, county of Antrim,	- - - - -	636 feet.
Lurtgethon, ,,	- - - - -	1,154 ,,
Carrowmurphy, ,,	- - - - -	819 ,,
Garron Point, ,,	- - - - -	764 ,,
Ballygally Head, ,,	- - - - -	797 ,,

† The following is an average section of the series in an ascending order:—

FEET.

1. Greywacke slate of Cultra, county of Down, dip south-east at an angle of about 30° from the horizon.

These strata are succeeded in an unconformable position by beds of sandstone, pinkish colored earthy limestone, and slaty conglomerate; the latter contains rounded masses of greywacke slate, quartz, and occasionally yellow and grey limestone, average dip north, at angles from 10° to 20° from the horizon; the thickness of these strata probably amounts to about - 50

2. Magnesian limestone, varying in color from yellow to dull grey, interstratified with red and yellow sandstone; thickness not ascertained, probably about - - - - 60

3. Brownish-red sandstone, composed of grains of quartz, cemented by an argillo-ferruginous paste—the rock occasionally effervesces briskly with acids. These strata contain much mica, arranged in laminæ parallel to the stratification; sometimes the beds are striped reddish-white, bluish-green, and dark bluish-grey; the strata contains clay galls; thickness not ascertained, probably about - - - - - - - - 300

4. Bright red, yellowish-white, and greenish-blue marl, arranged in beds which are often striped and mottled; in some localities these beds are traversed in all directions by irregular veins of fibrous gypsum, varying in thickness from half an inch to eight inches. The total

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Geological Structure of Ireland.

Upper Members of the Secondary Class.

It is unnecessary at present to enter into any detail respecting the succession of rocks which compose the great mineral basin of the north of Ireland, as its strata have already been described by several geological writers; we shall merely observe, that the magnesian limestone which occurs in the neighbourhood of Hollywood, on the south side of Belfast Lough, is identical in mineral character with that of the county of Durham, and other parts of the north of England, and that, like it, it is succeeded by beds of new red sandstone and new red marl; and, consequently, we may be said to possess portions of the whole of the upper series of the secondary rocks of England, with the exception of the oolite, though traces even of that formation have been discovered on the coast, near to Larne, in the county of Antrim.

The new red sandstone, which succeeds the magnesian limestone, is not altogether confined to the boundaries of the great mineral basin; it occurs in detached districts, resting on the carboniferous limestone, in the counties of Armagh and Tyrone, and likewise, as already mentioned, resting on the coal formation in the neighbourhood of Coal Island in the same county.*

A small district of new red sandstone, and red marl also, occurs to the north of Kingscourt, in the county of Cavan, between the coal district of Monaghan and greywacke slate. This district contains one bed of gypsum, upwards of 60 feet in thickness, which was ascertained partly by sinking, and partly by boring; but, owing to the great influx of water, workings have not hitherto been commenced for commercial purposes; but there can be no doubt that this district contains a valuable deposit of gypsum.

Secondary Trap.

Secondary Trap.—This district, which occupies portions of the counties of Londonderry, Antrim, Tyrone, Armagh, and Down, has attracted so much attention, and has been so frequently described, that it is unnecessary to enter into any particular details respecting it.

As already mentioned, the trap rocks cover the chalk, but their contact does not present the same regularity which is usual among strata having the same origin; on the contrary, the upper surface of the chalk generally presents a rough serrated outline, such as might be expected from a rock long exposed to erosion.

In some cases these indentations are filled up by the superincumbent trap, in others, by an accumulation of flints of a blood-red color, mixed with a

FEET.

thickness of these marl and gypsum beds has not been clearly ascertained, but they probably amount to - - - - - - - - - - 400

5. They are succeeded in some localities by black shale of various thicknesses. In Colin Glen, three miles south-west of Belfast, these strata are 20 feet thick, but at Larne, Red Bay, and Ballintoy, their thickness is more considerable, say average - - - - - 40

This black shale is probably identical with the clunch clay of England; it contains abundance of organic remains, especially *Grypheæ.*

6. The lias limestone succeeds the black shale; it is also variable in thickness and solidity. At Colin Glen it is about 30 feet thick, at Larne it is 50 feet; it may probably average - 40

The lias limestone contains a profusion of organic remains, the most common are *Ammonites, Pecten, Mya, Dentalia, Plagiostoma, &c.*

7. Greensand, or mulatto stone. This substance rests on the upper beds of the lias limestone. It is composed of rolled fragments of quartz, which vary in size from fine sand to some inches in diameter, cemented by a paste of green sandy earth. When this substance is of considerable thickness, its grain is usually fine, and it contains abundance of organic remains, particularly of *Spongia, Gryphea, Terebratulæ, Pecten, Cirri, &c.;* average thickness - 20

The upper beds of the greensand, or mulatto stone, frequently graduate into chalk. In this case the rock is composed of yellowish compact chalk sprinkled with greensand.

The chalk of Ireland contains the same organic remains, and it is in no respect different from the lower beds of that of England, excepting its superior hardness. This quality precludes its being used for many of the economical purposes to which the softer chalk of England is applied; hence, in the north of Ireland it has received the name of white limestone instead of chalk. In the county of Antrim it is very regularly stratified, but of unequal thickness. At the "White Well" quarry, three miles north of Belfast, there are 14 regular beds in a thickness of 70 feet: nearly in the centre of each stratum, there is an irregular bed composed of imperfectly connected masses of flint, which are usually of a globular form, but frequently present the most fantastic shapes; their colors vary from black through various shades of grey to white; the principal organic remains consist of *Terebratulæ, Pecten, Cirri, Ammonites, Echinites, Belemnites, Baculites, Spongia, &c.;* the average thickness may be about - - - - - - - - - - 60

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* The new red sandstone district extending from Coal Island, in a south-east direction towards Charlemont, has lately become remarkable from its being found to contain numerous casts of fossil fish of a variety of *palæoniscus.*

Appendix. No. I.

Geological Structure of Ireland.

Secondary Trap.

brown ochreous substance, which sometimes assumes the form of small globules of the size of a garden pea. This matter is evidently derived from the disintegration of the trap; and the red flints contained in it, though apparently solid when seen in the face of the cliff, fall into fragments the moment they are struck by the hammer.

It is remarkable, that the upper surface of the chalk, in contact with the tabular trap, has not been altered, while that in contact with whin dykes, or with larger trap protrusions, has been changed into granular marble. It is probable, from this circumstance, that the tabular trap which succeeds the chalk, was not in an incandescent state when it flowed over its surface.

The trap rocks of the county of Antrim are much more regularly arranged in beds than has generally been supposed. It is true that the same degree of parallelism is not observable in the upper and lower surfaces of each stratum, which is usual in sedimentary rocks, or that the division between the different beds is equally precise and well defined; but a great degree of regularity exists in the order of succession of the different strata, at least throughout the northern part of the district.

The beds of red ochre, which form so remarkable a feature in the cliffs of the north coast, westward of Bengore Head, when contrasted with the black colour of the trap which lies both above and beneath them, are the only ones which with certainty, and without difficulty, can be traced in this district. Without them it would have been impossible to have distinguished accurately between the different beds of trap, as the same stratum is frequently observed to change its character, and from coarse and crystalline, to become fine-grained and earthy; so much so, that in one part it might be called greenstone, in another, basalt, and in a third, amygdaloidal wacke. By the assistance of these ochreous strata, and also from the occurrence of a bed of wood coal in a particular position, the succession of the strata has been ascertained with some degree of certainty, particularly in that part of the district which extends northwards from Glenarm to the Giant's Causeway.*

In some localities the ochre beds become porphyritic, and pass insensibly into clay porphyry. This is the case at the Bull's Eye in Glenarm Park, and it is probable that the remarkable porphyry of Sandy Brae also belongs to the red ochre beds, while the porphyry of Cushendal probably results from fused red sandstone.

Greenstone Protrusions.

Greenstone Protrusions.—In addition to the tabular trap, we have yet to notice the remarkable protruded masses of trap which are not confined to the north-eastern district, but are observed more or less abundantly throughout the whole of the north and north-west of Ireland, among rocks of all ages and formations, and, consequently, must be considered to be of posterior origin to them.

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* *Section of the Trap formation of the County of Antrim, in an ascending series.*

1. The chalk is covered by amygdaloidal trap, which varies from 20 to 50 feet in thickness. The rock sometimes passes into greenstone, and affects a columnar structure.
2. Greenstone, sometimes amorphous, sometimes rudely columnar, and varying from 30 to 80 feet in thickness.
3. Greenstone which sometimes passes into basalt, and sometimes into amygdaloidal wacke; it varies from 60 to 100 feet in thickness. The uppermost layers of this stratum are visible at low water, at the base of Bengore Head.
4. Six alternations of coarse-grained black trap, with thin irregular beds of red ochre, 70 feet thick, at Bengore Head.
5. Red ochreous clay, which graduates into lilac coloured lithomarga, speckled with white, about 20 feet thick on the Causeway coast, but 200 feet in Island Magee.
6. Reddish-black ferruginous clay, probably decomposed trap, one foot thick.
7. Great range of columnar basalt.—This stratum, which is 100 feet above high water, at Bengore Head, dips towards the west, and forms the celebrated basaltic pavement, called the Giant's Causeway, by its intersection with the plane of the sea; it is 45 feet thick.
8. Irregularly columnar basalt.—The columns are small and lie in all directions, being observed vertical, oblique, and horizontal; and frequently bent in fantastic forms. This bed contains a stratum of wacke, and one of wood coal; the whole is about 50 feet thick.
9. The ninth stratum is composed of columnar basalt, but the columns are not so regular as those of the great bed which forms the Causeway. This stratum, which is the uppermost at Bengore Head, is about 50 feet thick; above it are six others, composed of rudely columnar and amorphous trap, with two beds of red ochre. According to Doctor Richardson, their thickness amounts to 164 feet. Thus, the whole thickness of the strata, which compose the trap formation in the north part of the county of Antrim, amounts to about 600 feet; but these strata appear to be quite unconnected with the lofty summits of some of the mountains, which, in many cases, do not belong to the tabular trap, but to subsequent protrusions.

Greenstone Protrusions.

These protrusions consist of two kinds, namely, whin dykes, or basaltic veins, and huge amorphous masses of greenstone, or greenstone porphyry, which occasionally form large mountains, and which, among igneous rocks, are only secondary to granite in point of extent and importance.

It is unnecessary at present to enter upon the subject of whin dykes, further than to state, that their general direction in the trap district of the county of Antrim is nearly north and south; in the slate district adjoining the Mourne mountains of the county of Down, their direction is north-west and south-east; in the counties of Tyrone and Fermanagh, where the dykes are unusually large, and where their continuous length has, in some instances, been ascertained to exceed seven miles, the direction is south-east; and in the counties of Mayo and Sligo, the direction of the remarkable dykes described by Archdeacon Verschoyle, is east and west; but these dykes or narrow protrusions, however instructive and important when observed in detail, dwindle into insignificance when compared with the gigantic greenstone protrusions of Knockmorden and Urrisbeg in the county of Galway; of Carlingford mountain in the county of Louth; of Slievegullion in the county of Armagh; of Slievegallion in the county of Derry; of numberless minor mountains in the county of Donegal; of Ballygally Head; of Ballygawn; of Sleamish, and of many other remarkable greenstone protrusions of the county of Antrim.

Hitherto many of these great mountain masses have been considered to belong to the primary class, and to be nearly coeval with granite; but from the striking effects which they have frequently produced upon chalk and other rocks belonging to the more recent of the secondary class, it becomes demonstrable, that in many instances they are either coeval with, or of subsequent origin to ordinary trap dykes.

Tertiary Formation.

Tertiary Formation.—In Ireland, the tertiary formations are less extensive than those of England; they are probably lacustrine, though as yet no animal exuviæ have been discovered to enable us to determine that point.*

The most important deposit belonging to this class is situated along the south-eastern margin of Lough Neagh, between Washing Bay, near Mountjoy Castle, in the county of Tyrone, and Sandy Bay, in the county of Antrim.

In the county of Tyrone, and the northern part of the county of Armagh, this deposit occupies a district of ten miles in length, by five miles in breadth; it is composed of alternations of white, brown, and greenish-blue clay, with white and grey sand, and irregular beds of lignite, or wood coal, and in the margin of Lough Neagh, of silicified wood.

In some localities the lignite is very abundant, and particularly on the shore of Sandy Bay, on Lough Neagh, where, during seasons in which fuel is scarce, the inhabitants occasionally sink pits and raise it for domestic purposes.†

In the parish of Clonoe, in the county of Tyrone, the clay beds rest on the new red sandstone, which overlies the coal formation of Coal Island, and during the last ten years several trials were made by boring in the clay district, in the expectation of finding the coal beneath it. Two of these trials in the townland of Anaghmore, were continued to the depth of 294 feet, without reaching the red sandstone; and several other trials were made in different parts of the district, with the same results.

The elevation of the surface at Anaghmore is 110 feet above the level of the sea, and 62 feet above the level of Lough Neagh; and, consequently, it becomes evident that the bottom of this tertiary deposit must be, at least, 184 feet below the level of the sea.

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* The apparently elevated gravel deposits of the county of Wexford, and other localities which contain marine shells, have not been as yet sufficiently explored to determine whether they should be classed among the tertiary formation, and consequently they have not been included in that series.

† The following is a result of a trial by boring, made at Sandy Bay, many years since:—

	Feet.	Inches.
Blue Clay,	10	0
Black Lignite, mixed with Clay,	25	0
Clay,	2	6
Black Lignite,	20	0
Clay,	4	0
Black Lignite,	15	0
Total	76	6

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Geological Structure of Ireland.

Tertiary Formation.

The clay district of Lough Neagh is similar to the potters' clay district of Bovey, in Devonshire, and pits have been opened in many parts for the purpose of raising pipe-clay and potters' clay; but hitherto no beds of a pure white color have been discovered, at least none which preserve their white color when exposed to the heat of the potters' baking furnace; but there can be no doubt, if proper trials were made in different parts of the district, that pure white potters' clay would be discovered.*

Potters' clay, similar to that of Lough Neagh, occurs in a valley resting on the carboniferous limestone situated to the south-east of Cahir, in the county of Tipperary; and many years since, considerable quantities of clay were raised and exported from thence to the potteries in England. White clay also occurs in a similar position, resting on limestone, near St. John's Point, and other localities on the western bank of Lough Ree, in the county of Roscommon. In this neighbourhood the clay is used in the manufacture of tobacco pipes; but no potteries have hitherto been established.

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* In the townland of Anaghmore the upper stratum of white clay is seventeen feet thick, and white clay, of equal thickness, has been found at the surface in many other places, but, owing to the difficulty of freeing the pits from water, few have been sunk to a greater depth than from ten to fifteen feet.

APPENDIX.

No. II.

Appendix. No. II.

SUGGESTIONS ON THE POWERS TO BE GIVEN TO RAILWAY COMPANIES, AND THE RESTRICTIONS TO WHICH THEY SHOULD BE SUBJECTED.

Powers and Restrictions on Companies.

THE powers to be given to Companies undertaking Railways, and the restrictions to which they should be made subject, are questions for the serious consideration of the Legislature.

It was difficult, indeed scarcely possible, to come at once to just conclusions on a subject so novel, and operating in so many different ways, and by so many influences, upon the varied relations of property and commerce.

Much has been done, but much still remains to be effected in the arrangements, before a thorough understanding can be arrived at, of the encouragement which ought to be given to these establishments, for the benefit of the public interest, without trespassing unduly upon private rights and property.

It is a question of very great difficulty, and cannot be satisfactorily disposed of, in each distinct case, by that tribunal to which, like ordinary projects of private speculation, these undertakings have been hitherto referred, namely, a Parliamentary Committee.

An investigating body for deciding upon the merits of a great Railway project, should, undoubtedly, be composed of individuals selected for the task, on account of their possessing a competent knowledge of the general nature of the business and matters to be submitted to them; and if the same individuals were permanently occupied in similar investigations, their efficiency would, of course, be increased on account of the greater facility of forming a sound judgment, which a continued familiarity with the general subject, and the consideration of many cases would thus afford them.

Such a body, besides hearing and examining the representations and arguments of parties interested for and against a project, should have the power to order any other researches which might be judged necessary to be made, through means of agents of its own selection; and it would reject the vast quantity of irrelevant matter and lengthened discussion, as well as those repetitions of arguments and evidence to points previously decided, which must be necessarily entered into before Committees that are newly organized for each separate occasion.

It will be immediately perceived, that these are advantages which are not, and cannot be possessed by Parliamentary Committees.

It is a further objection to the present system, that a double process is necessary, in consequence of a separate inquiry taking place before each House; when it is evident that a thorough and efficient examination by a body deputed for the purpose, would form a sufficient foundation for legislating in both.

On the introduction of one of these great undertakings, there are many important interests to be considered, which require to be more or less protected; but it does not appear that protection has been afforded hitherto in due proportion to their relative importance.

These interests may be classed under the following heads:—

1. The Company itself.
2. Rival Interests; such as Competing Lines, Canals, &c.
3. Future Branches or Extensions to the same Line.

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4. Parties from whom Property or Rights are to be taken.

5. To protect the interests of the Public, in the first instance, so as to prevent, as far as possible, their becoming the dupes of artful Speculators.

6. Public Economy and Convenience, as they may be affected by the future results.

1. *The Interests of the Company.*

The great advantages that may be derived from Railways, if established on a proper basis, being indisputable, it would be proper to afford to a duly qualified body, desirous of undertaking them, every facility to bring forward their respective projects, and every encouragement when they have satisfactorily established the real merit of their plans.

In whatever way this facility be given, the preliminary expenses must still necessarily be great; but the parties might be spared many of the very extravagant charges, and of the numerous difficulties and delays to which they are at present subjected.

The cost of procuring an Act of Parliament for these undertakings, which is enormous, particularly when they are opposed, might be much reduced, by adopting a more efficient system of investigation, and prosecuting it, in certain cases, in the neighbourhood of the subject of inquiry —by the passing of a general Act for regulating such matters as are common to all Railways, and by some minor regulations that will be found adverted to in the annexed remarks upon the details of the Standing Orders of Parliament.

They might also be protected from the extortions of individuals, to which circumstances and prescribed forms render them frequently liable.

Every person who is compelled, for the promotion of public objects, reluctantly to surrender rights or property, is entitled to a full and liberal compensation; but when the propriety of the measure is established, justice and the public interests require that such compensation should be within reason. Some regard also should be had to the general benefit which the neighbourhood will derive, and even direct allowance made in cases where it appears manifest that the individual would obtain great collateral advantages. Thus if it be evident, that a Railway, either by an adjoining station, or for some other cause, will raise the value of land or premises, a proprietor should not be entitled to the same rate of remuneration for a portion of his estate contiguous thereto, as if he were required to give up the whole of his possessions in that place. This principle has been carried in America so far, that juries have actually awarded compensation to be paid to Railway Companies, by proprietors, for leading the work into their lands.

These considerations are peculiarly applicable to Ireland, where it is the direct interest of almost every individual to call forth and stimulate the resources of the country, and where there is little danger of an injurious interference with existing establishments. It is otherwise in England, which is advanced to a state of improvement so near perfection, that doubts may be in many instances entertained whether the actual existing advantages are not greater than can be supplied by the introduction of any changes or novelties however promising.

In Ireland no such doubts can exist; by ordinary precaution there will be little to sacrifice, but much to gain; therefore the guards with which existing rights are protected at the cost of so much inconvenience, expense, and delay, might, in this country, be greatly simplified.

The mode of determining the amount to be paid for land and damages, by the adjudication of a jury, appears to be defective, and not always calculated to lead to satisfactory results.

Independently of the strong opinions, either favourable or adverse to the project, which are likely to be held by persons selected from the district where the work is to be carried on, and of the sentiments with which they may be also conscientiously impressed, as to the degree in which compensation should be made to individuals, by public bodies, whether Joint Stock Companies, or the Government; the subject is not usually brought before them in such a shape as to enable them form a correct judgment.

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All the information afforded them, is the evidence of extreme opinions in favor of, or against the claims; usually of the most discordant character, which cross-examination only tends to make more obscure; and further mystified by the artful pleadings of counsel, applied more to their feelings than to their judgment. On the confused mass thus laid before them, they have to give a hasty decision.

It is true, the Jury is advised by a Barrister as an Assessor; but he, himself, does not possess the proper data, and is, besides, scrupulous not to interfere respecting the important inferences to be drawn from the evidence; his chief employment, being to unravel and clear away the perplexities which are raised by the adverse counsel.

Instead of the usual Jury, it would be advisable to substitute one consisting of a smaller number of persons, three or four at most; not necessarily professional men, but selected for the purpose, brought from a distance, and perfectly independent of all parties; equally under an Assessor, who should inform them on questions of law, that must occasionally come before them, and, by watching their proceedings, afford additional security to the public.

This body, like that proposed for investigating the merits of the Railway projects, should be enabled, or perhaps required to obtain, in addition to the evidence produced by the parties, that of independent valuators.

Such a proceeding would be deliberate, and would become more simple and more satisfactory in its results, and even less expensive than the ordinary mode, where the valuations, as in the case of Railways, amounted to considerable sums. A vast deal of the delusive and irrelevant matter, now commonly brought forward, would be found of no avail before such a Court, and any thing like collusion would be very difficult, if not impossible.

Should there be any difficulty, however, in abandoning the principle of the ordinary Jury, it would be at least expedient to reduce the number to five, or at most, to seven, and to appoint independent competent valuators, under some fiscal or public authority, whose opinions might guide the Jury in a great measure, amidst the conflicting evidence produced by interested parties.

But the most serious evil to which these Companies are exposed, in the acquisition of property, is the power which individuals occasionally possess, owing to peculiar circumstances, to extort very unreasonable amounts of compensation.

It is notorious, that the consent of men of great influence has frequently been obtained, as a matter of policy, by agreements to pay amounts, totally out of proportion to the value of the land or premises required; and where the assents of individuals will preclude the necessity for recurring again to Parliament, as in some cases of proposed deviation, the matter to be considered is sometimes a calculation, not of the real value of the required property, but of the amount which the undertakers of the measure can afford to pay, in preference to applying for an amended Bill. Occasionally, even the alternative has proved so onerous, that it has been judged better to abandon altogether a useful improvement.

It would not be easy to provide remedies for either of these cases; but a more improved system of investigation into the merits of the projects, would leave the result of obtaining the necessary Parliamentary sanction less liable to caprice or influence; and it may be hoped that on such improved system, some matters, now requiring new Acts of Parliament, might be authorised under other forms.

There is another necessary step, preliminary to appearing before Parliament, to which some importance is attached, but which might be advantageously dispensed with in Ireland. It is that of obtaining lists of the assent or dissent of proprietors along the line of Railway.

It is not easy to perceive why such a form should be required; there is no situation in Ireland to which a Railway of any extent can be carried, where there can be any real difficulty in putting a fair money value upon the property that is necessary to be taken for the purpose; and the utility of the project should stand on far too determined and obvious a basis to admit of the peculiar views or inclinations of the owners or occupiers of property forming a necessary criterion of its merits.

To make the assent of proprietors necessary for obtaining the power to

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establish one of these great undertakings, is, in reality, to abandon the high principle, that private rights (liberally paid for) must give way to great public interests.

The purpose which this formality is most usually made to serve, at the present time, is, to enhance, by pretended dissent, the amount of compensation; many a dissent being purchased off by what can only be denominated a bribe.

If it were practicable in Ireland to make the selection of the line of country through which a Railway was to be carried, depend, as is sometimes done in America, upon the terms on which the land could be obtained, the amount of claims would be very different from what it is likely to be where the line is fixed upon by other considerations.

It is not solely with a view to benefit the Companies of undertakers, that these acts of justice and encouragement should be enforced, but also for the advantage of the public at large, for it would be a great mistake to imagine that there is no public interest involved in reducing the expenditure attendant upon the construction and maintenance of Railways; whatever may be the amount of profits sought by the Companies, extravagant expenditure must ultimately be paid for by the passengers and traffic; whereas, an economical arrangement, and reduced expenditure, may lead to reduced charges and greater accommodation.

If the whole system could be lightened of the enormous expenditure now looked upon as a matter of course, and which, without doubt, might be reduced in every part, a general system of reduced charges would naturally be the consequence.*

2. *Rival Interests, such as competing Lines, Canals, &c.*

The necessity of avoiding, particularly in this country, a waste of capital by an accumulation of operations towards the same object, cannot be too strenuously insisted on.

Where the need of improvement is almost universal, and so wide a field is open for the extension of new resources, it would be most unwise to admit of ruinous competition in the prosecution of any single object; the history of the two great canals out of Dublin, affords a most useful lesson on this head, as well as a caution against interfering in any way that can be avoided with these or other Navigations; for although they do not afford precisely the same nature of accommodation as Railways, still a double establishment precisely in the same line, must be most injurious to one or the other, or perhaps to both.

The interests engaged in the traffic of the high roads, which might be supposed likely to be affected by the construction of Railways, are not so considerable as to be ultimately much injured; the increase in lateral business will very soon more than compensate for any loss on the direct lines; the operation of the works of construction, while in progress, will produce considerable intercourse; and the labouring classes now engaged in that traffic will, both at the time, and subsequently, meet with greatly increased means of employment.

With respect to competing lines of Railway, any question regarding them will be speedily disposed of, should the suggestions in the body of the Report of the Commissioners meet with the approbation of the Legislature.

3. *Future Branches or Extensions to the same Line.*

The policy of undertaking extensions or branches to established Railways has hitherto been dependent solely on the probable traffic of those subsequent additions. The consequence of leaving them thus entirely to their own resources in this country, would be, that the leading lines would be taken up for certain distances likely to prove remunerative, without a hope of any further operation; the only remedy then for parties desirous of promoting Railways to more distant, or to other places, would be to obtain a power to carry their own distinct line also to the capital or other point whence the productive traffic is to be obtained, and thus rival lines would be constructed where a single communication would answer every useful purpose; or else, the original work allowed to remain within its own solitary limits, and a check given to further improvements, in either case, after very expensive trials for power before Parliament.

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* The lavish expenditure which prevails through a great part of the proceedings in Railway undertakings, is much to be regretted. The solicitor and the engineer seem to act without any control whatever. When the works are to be executed, every consideration is certainly given to limiting the contractors, workmen, &c., to the lowest practicable amount of profits; but the savings that might be effected in all the other operations, in the degree of remuneration for services rendered, and in the formation of the project, are little regarded.

The obvious remedy, and it appears very reasonable, is to provide, by legislative enactment, that every branch or extension should partake in the gross receipts gained by the Trunk Line, on all the traffic which it brings to that Trunk Line.

By the mutual exchange of a way-bill, and comparing accounts periodically, it is apprehended, that a debtor and creditor account might be regulated by some little arrangement and mutual understanding; the amount to be allowed to the branch being regulated by a scale of comparative distances.

4. *Parties from whom Property or Rights are to be taken.*

Every precaution that could be devised seems to have been adopted by the Legislature, to protect the rights of landowners with respect to the property that might be required for the construction of Railways and other public works; and therefore little is necessary to be stated here upon the subject.

Allusion having been made to the undue advantages which might be taken of the forms which have been raised for the security of proprietors, it must, on the other hand, be recollected, that their rights should not be lightly meddled with or invaded: and never beyond what the necessity of the case absolutely requires.

They should undoubtedly be remunerated liberally, not only for the precise amount of land or other property of which they may be deprived, but for every collateral loss they may sustain; so that in cases where it may unfortunately be necessary to disregard their feelings, they may be protected at least from being deprived of actual property without obtaining an equivalent.

Where a series of properties, highly ornamental, or otherwise of peculiar value, and with which the proprietors may be unwilling to part, is to be interfered with, it will constitute a necessary part of the investigation, whether the object is worthy of such a sacrifice; for it is not to be supposed that such species of property, should be placed absolutely at the mercy of any Railway, and perhaps one of doubtful advantage.

In the observations on the specific standing orders which will be found annexed, some modifications in the mode of giving notices to proprietors are recommended.

5. *To protect the Interests of the Public, so as to prevent, as far as possible, their becoming the Dupes of artful Speculators.*

The prevailing mania for Railway speculation, and the traffic in shares connected with undertakings, the probable result of which can be but imperfectly understood, are dangerous evils to contend with, and the more so, as they tend to render the public liable to the most gross delusions.

In the attempts to provide a remedy against these, much damage has, by a natural reaction, been done to the most legitimate operations; and therefore it becomes a matter of great interest to ascertain by what means injudicious or delusive speculations may be checked without acting injuriously on those which are really deserving of support.

The great majority of these projects originated with professional men, or others seeking for profitable employment, which such undertakings afford to a great extent; and these gentlemen obtain the support of real or pretended capitalists, by the prospect of sharing with them considerable gains, if they can lay a tempting statement before the public.

Those who have the discretion and judgment to originate propositions really of value and general interest, labour beneficially for the public as well as for themselves; but, unfortunately, the advantage of projectors does not depend upon that contingency; for, provided they can by any means excite

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an interest, and keep it alive for a certain period by plausible statements, their own profits are secure.

This occasions the country to be overrun with such schemes;* the good mixed up with bad; and both, even the former, supported by such exaggerated calculations, as to leave much doubt and uncertainty as to the actual merits of any; an uncertainty but little removed by the nature of the investigation which takes place before Parliamentary Committees.

In many instances the first consideration in forming these projects in England has not been the benefit of the country, although the country will be greatly improved by many of them; but the primary object has been the personal advantage of the originators.

This is not stated in disparagement of such a motive, which is natural and legitimate when prosecuted with honesty and fairness; but it points out the necessity for anxious watchfulness, in every instance, after the public interest.

It may be hoped that Ireland, by the researches with which the Railway Commissioners have been charged, will be saved from much of the evil that has been experienced in England on this account; but still every new project, even in this country, whether in conformity with their recommendations or otherwise, should be carefully and efficiently examined, more particularly with a view to guard against exaggerated and delusive statements of probable profits, grounded upon low estimates of outlay, and high calculations of traffic.

Even the statements of the Commissioners, though, in several instances, limited by expressions of hope, far short of certainty, and modified by the conditions of economy and good management upon which their calculations are founded, will probably be appealed to as positive assurances of facts, independent of any qualifying circumstances whatever.

But, altogether, it is reasonable to expect that gambling transactions in connexion with ill-founded and delusive schemes, together with the undue profits of those professional men who are mainly instrumental in setting them on foot, will be exposed and arrested by an efficient and vigilant system of investigation.

It is, perhaps, impossible altogether to prevent the traffic and gambling in the shares of those undertakings that shall be approved of. Time will be found the best, if not the only corrective, as the real value of the article will by degrees be better understood, and therefore be less liable to fluctuation. Some direct provisions, by throwing difficulties in the way of such traffic until the operation shall have arrived at a certain point, may perhaps afford a partial remedy; it is apprehended, that those hitherto devised for that purpose, will admit of improvement, as explained in the specific remarks on the Standing Orders of the two Houses.

The Act for the Dublin and Kingstown Company required the payment of calls on the shares to the amount of 20 per cent. before they could be legally transferred, which must have effectually prevented the interference of professed jobbers in shares.

6. *Public Economy and Convenience as they may be affected by the future results.*

The considerations presented under this head, are not only very important in themselves, but they appear more difficult to grapple with, as to any hope or means of overcoming them, than those which attend any other part of the subject.

When the engrossing tendency of Railway establishments is considered; superseding, as eventually they must, all other means of internal communication, and holding the public dependent solely, and in most cases, even without the power of selection, upon this mode of travelling and of traffic; it cannot be denied that just apprehensions may be entertained of much inconvenience, trouble, and expense to the public, as the consequences of investing the Joint Stock Companies, as they have been, with power so great as to extent, and so unlimited as to time.

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* The amount of capital authorised to be raised for making Railways, under Acts passed in 1833, 1834, 1835, and 1836, was upwards of 29 millions. The estimate for those for which Bills were petitioned in 1837, was very near 31 millions.

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Bodies having no motive of action but their pecuniary interests, frequently swayed by caprice, jealousies, and any thing but enlightened views, even towards their own interests, will have entire and uncontrolled possession of the main avenues throughout the country.

In treating a subject of this nature, every approach to personal or invidious reflection should be avoided. The inquiry has to deal with general considerations; and if it glance at particular instances, it is for purposes of illustration merely. A particular case here presents itself; a case so illustrative of the manner in which the public interests may suffer, through the uncontrolled and exclusive power just alluded to, that it could not be omitted without injustice to the argument. It is introduced here with less reluctance, inasmuch as none of the parties appear to be personally liable to censure for the part they have taken.

The line of Railway between London and Liverpool, is divided among three Companies:—

1. The London and Birmingham, extending to the latter town;
2. The Grand Junction, from Birmingham to Newton;
3. The Liverpool and Manchester, from Newton to Liverpool.

Thus, the degree of facility, which shall be afforded to the great traffic of the important town and port of Liverpool, as well as of a great part of the north of Great Britain, and of Ireland generally, is dependent, not only upon the arrangements made by each of these three Companies respectively, for their own lines, but on their joint and mutual co-operation. And, as a specimen of the consequence of a want of this connexion, the following facts may be stated:—

At Birmingham, the two Railways of the different Companies, enter the town by two costly converging lines of viaduct, at no great distance asunder, and were designed to terminate at stations very near to each other; —the one has been completed to the intended terminus, the other has stopped short at the entrance to the town, with the intention, it is believed, of endeavouring to form a junction in the direction of the course to London; to obtain this object, however, a new Act of Parliament will be necessary; different interests must be reconciled, and even then, the communication from that line to Birmingham, will be less convenient than from the other.

In the mean time, the public, who may be going beyond Birmingham, are subjected to great inconvenience and delay, which, by a mutual accommodation might easily have been avoided. Not only has no connexion been made between the two lines, but even the hours of arrival and departure for the trains have been, for a long period, not made to coincide; thus, the passengers on the arrival of one train had, and perhaps still have, to proceed with their luggage, by Omnibuses to the other, and to wait sometimes for hours, before they can continue their journeys.*

Instead of this ill-contrived arrangement, if the junction between the two had been made in the more direct course between London and Liverpool, and from thence, one joint viaduct carried into Birmingham, every convenience would have been afforded to the public, and a vast expense saved to the Companies themselves.

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* *Extract from a Letter from London, dated* 18*th April*, 1838.

"On Monday, the 5th of March, 1838, the Liverpool and Carlisle mail coaches from London arrived at the Grand Junction Railway station at Birmingham, and the passengers, together with their luggage and the mail bags, were delivered from those coaches into the station-house previous to 28 minutes after 7, A. M., by the clock in the station-house office. Many, if not all of the passengers, were desirous of moving forward by the first class train, which was appointed to start at half past 7, A. M., but, notwithstanding their earnest applications and remonstrances, they were not permitted to purchase tickets, nor to enter the Railway carriages, although five minutes elapsed between the arrival of the mail coaches and the departure of the Railway train, and although many vacant places were observed in the Railway carriages. The third northern or Manchester mail arrived before the train started, and its passengers were also left behind. It was also stated, that all the mail bags of these three northern mails were left at this station. Breakfast was offered in the station-house to the passengers, at the same time that they were refused permission to proceed by the train.

"In consequence of this detention, the passengers, and probably the mail bags, were obliged to use the second class train, which started at half past 8, and did not reach Liverpool till about 3, P. M., instead of 12 o'clock. The Manchester train probably was equally delayed, and all the northern letters and passengers which leave the train at Warrington must have been so proportionally.

"General and great inconvenience must be the consequence of detentions of this description. Important appointments were made on the occasion quoted, which were, of course, broken, but which, under the old system of mail coaches, would have been kept with certainty of regularity."

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It is to be presumed that all this arises from the calculation made by each of the Companies respectively, that they have nothing to gain by giving the additional accommodation so desirable; but, on the contrary, might incur some expense, or sacrifice some local convenience, for that purpose. Under such circumstances, therefore, it is, perhaps, scarcely to be expected that they should consider themselves bound to comply with the wishes of the public.

There may be, and probably is, some little disagreement between the Managers of the two Companies as to the manner of co-operating, and the extent to which each ought to contribute.

The public in the mean time are far from enjoying the advantages which those establishments are capable of affording; and it is a very fair sample of the countless ways in which the general interest may suffer from the unrestrained powers given to Railway Companies.

This want of co-operation will be an evil of constant recurrence, and one that will be severely felt; each party will naturally make those arrangements exclusively which shall be most favourable to its own traffic; and no circumstance will constrain them to a unanimous consideration of the public interests, but a competition, which in many cases, and as regards Ireland, probably in all, will be hopeless.

Should there be, eventually, two modes of reaching Liverpool, or any place beyond, by Railway, the one by Birmingham and the other by a different line, the two Companies running to that place would speedily adjust their arrangements with a view to obtain a preference, but probably no farther; and this consideration, which will form the best, and, perhaps the only argument in favor of the ruinous expedient of closely competing lines, may be the means of their being established; a most extravagant and improvident remedy for what might be so easily arranged by a little mutual accommodation.

This danger of want of co-operation, affords an additional objection to short lines, with a prospect of branches or extensions by other Companies, besides those grounded on the extra expense for management, Acts of Parliament, establishments, &c.

The more such divisions can be avoided the better. The evil results to be apprehended from them are very considerable; not only may they exhibit themselves in such instances as that above referred to, of neglecting to turn to the best account the means already provided for public accommodation; not only may the Directors of two contiguous lines prove adverse to form a junction, but one Company may decide upon a different width and construction of rail altogether, may adopt different levels at the place of meeting, or be in many respects wanting in coincidence with another, and may thus render any future junction impracticable, without incurring enormous expense.

These arguments, together with others, are strongly in favor of the united system, which seems absolutely essential to the success and public utility of the Main Lines in Ireland.

Precautions should also be taken against allowing parties to execute a portion only of any given lines for which they may obtain Acts of Parliament.

By such proceeding they might neglect to provide the accommodation which formed the principal inducement with the Legislature to grant the Act; and having only opened the portion which they see reason to believe to be remunerating, might leave the remainder with little prospect of ever being completed. They should certainly be bound to the completion of the whole undertaking, and within a limited period.

It has been found that the high speed on Railways is attended with a greater increase of expense than was at first anticipated; and it may be, therefore, expected that the speed will, by degrees, be reduced till it shall be no more than barely sufficient to maintain unrivalled possession of the business.

The number of trains during each day will be regulated also on the same principle; in short, every arrangement will have reference solely to the profit of the concern; and the public, in consquence, will not obtain the benefits that might reasonably be expected, and, under good arrangements, would be afforded.

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The inconvenience which was alluded to in the First Report of the Commissioners, as likely to result from allowing the service of the Post Office to be entirely at the mercy of Railway Companies, has now been experienced, and to such a degree, as to render it absolutely necessary to apply to the Legislature for a remedy.

This leads to the embarrassing and somewhat arbitrary proceeding, although quite necessary, of an *ex post facto* law interfering with what has been inconsiderately sanctioned as a vested right.

The Companies have no reason to complain of such a power being exerted, when proved to be necessary for the protection of the public; they themselves could not have existed without an interference of a similar kind with landed proprietors, as well as with many other valuable interests; and they will still by their position be enabled to enforce very large remuneration for every accommodation afforded. In fact, the oversight, whatever arrangement may be adopted for its remedy, will leave them in possession of great advantages, for what ought and might have been much more reasonably adjusted, in the condition of their Act of Incorporation.

The obvious remedy now, is to make it compulsory to carry the Mails in such manner, or by such kind of vehicle as the Post Office shall approve;* the hours of departure, places of stoppage, as far as may be necessary for the taking up and delivery of the bags, and the rate of travelling (not exceeding what can be shown to be perfectly practicable with safety) to be regulated by the Post Office, being subject to the usual high penalties for any but accidental causes of delay or failure; and even in cases of delay arising from accidents, it might be attended with good effect to enforce a penalty, as a stimulus to the exercise of greater vigilance and industry as well in adopting as in devising precautions against their recurrence, and in applying the readiest remedies when they do occur.

For this service, the existing Companies have a full right to claim not only to be reimbursed for every really extra expense to which they shall be subject, but to receive a reasonable profit on the business in addition; the amount, however, not to be precisely according to their own calculation, but, in case of difference, to be regulated by a fair arbitration by competent persons.

When this account shall be duly considered, it is apprehended that the cost to the Post Office will not be so heavy as might at first appear probable; but an argument has been employed by evidence before the Committee of the House of Commons on this subject, which may be adverted to as strongly illustrative of the evils to be anticipated from the unrestricted powers hitherto given to Railway Companies.

In order to justify the demands of one of these Companies, it was stated, that the entire expense of the night service of trains for conveyance of the Mails, including all the watchmen and gatekeepers along the line, &c., must be considered an extra expense, because there was reason to believe that all the passengers who accompanied those trains, would still be customers by day if the night trains did not run.

Now, not only is the general despatch of business materially promoted by the power of travelling by night, but many persons, for various reasons, set a high value upon the saving of time thus effected. This is proved by the fact of night travelling being resorted to so commonly, notwithstanding the manifest privation of ease and comfort that attends it; and yet, according to the above reasoning, the public are to be precluded from this advantage, because the Railway Establishments are sure of the Passengers, at the times best suited to their own interest and convenience. If they are to be regulated by such a principle, the expense of night trains, necessarily greater than any other, will not be incurred, nor that of a greater number by day, than may be absolutely necessary for the conveyance of all the Passengers, in the most crowded and economical manner; and these arrangements may and will be made, not only to obtain a moderate return for the capital expended, but where the difference may tend to increase enormous profits, by a small addition.

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* An arrangement may, perhaps, be made for the Company to provide the wheels and axles on which the Post Office may have their own carriage constructed, being limited to certain dimensions and weight if necessary.

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This is the manifest consequence of an absolute monopoly. The parties have only to adapt their accommodation for the public, to the precise extent that will keep down any competition by the roads; and this may be easily effected.

A limitation of profits to 10 or any other degree of per centage has been proposed, to meet in part this evil; but such a principle would be impolitic as well as unjust, tending to check useful enterprise, and to take away the inducement to good and economical management and to great improvements, which usually spring from hopes of large rewards; and it would be also quite inefficient; for it is easy to perceive, that in such case, whenever the maximum of profit can be readily obtained, any excess will be wasted in expensive establishments and extravagant outlay, and distributed directly or indirectly in the shape of salaries, allowances, and immoderate charges, among the managers and their friends and dependents.

With reference to the carriage of the mails in Ireland, it is presumed, that there will be no necessity for any considerable amount of extra expense.

By adopting the most rapid communication from London, the important London mail may be forwarded from Dublin at least by 3, P.M., and may reach the most distant points of the Railways, as at present proposed, by an accelerated rate, before 10, P.M. This, therefore, may be deemed a day transit. The return will also be effected in the morning; commencing, however, at remote points, somewhat earlier than might be found generally suitable to the mere convenience of the Company. The intermediate mails may be conveyed also by day.

Some remuneration may be required partially for extra hours, and for the extra speed; but it is to be expected that an additional charge may be put upon the passengers, in consequence of that advantage, that will in some degree cover the expense.

With respect to the taking in and delivering of the bags, there can be no difficulty in making arrangements by which that service may be executed without stopping, or even interrupting the speed in the slightest degree.

It would be endless to attempt an enumeration of the instances in which the arrangements of Joint Stock Companies not only may be, but are likely to be prejudicial to public convenience; and probably it will be admitted, that this is not one of the ordinary cases in which parties should be left to the uncontrolled management even of their own affairs.

These establishments will exercise a paramount influence over some of the most important concerns of society; for they will possess the only public means, which will be left, of communication and intercourse between the principal parts of the United Kingdom. They will, therefore, become objects of very great interest to the community, and most deserving of the serious consideration of the Legislature.

In all other countries, the periods for which the exclusive rights and powers of Railway Companies have been granted are limited, or the parties are made liable to some species of superintendence or control; in some instances, restrictions of both kinds are imposed.

It is clear, that a country reserving a control over the Railways, and, above all, providing for the entire property in them devolving to the State after a given time, beyond which the receipts in tolls need not exceed the amount of current expenses, will have a very great commercial advantage over one, where the only means of transit will be for ever subject to heavy imposts for the benefit of the respective proprietors.

In the United States of America, where the Railway system has been carried to a far greater extent than in any other country, the powers given to associated Companies, (by whom they are almost entirely executed) appear to be very large, and the restrictions upon them very small.

These works, however, are chiefly undertaken by the landed proprietors, farmers, and persons connected with trade or manufactures along the line. The general projects are brought, in the first instance, before popular meetings in the districts through which the proposed line is to pass, where their policy is discussed, and observations regarding them elicited. Having obtained the sanction of public opinion, the parties next obtain, before even the surveys are made, an Act of Incorporation, with very little trouble or expense. They are by that Act empowered to carry the Railway in any direction they please, on making compensation for the land or premises

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interfered with, for which it is considered there can be no difficulty in fixing a money value, and that in doing so no hardship whatever can be incurred; indeed much of the land is frequently given gratis, and the general impression is, not to allow more for compensation, when the object is to promote such useful undertakings, than a perfectly fair and reasonable amount.

The process, in case of the parties not agreeing as to the amount to be paid, is, for certain Courts to appoint three proper persons, who investigate and decide; subject still to an appeal to the ordinary Jury Court, the expense of such appeal falling upon the party against whom the Jury shall finally give a verdict.

Thus two great sources of trouble and expense, the Act of Incorporation, and the Compensation for Land, are readily adjusted.

The Companies are bound to provide proper fences, gates, &c., to take measures not to encroach unnecessarily upon the public intercourse or convenience in crossing roads, navigations, &c., and to complete the line within a given time; but they are unrestricted in their rates of charge, and not bound to yield any peculiar accommodation to the public or the State.

There are, however, two or three circumstances that may partially counteract these uncontrolled powers, and possibly lead to an amendment of the system; one is, that the property in the Railway is rarely given in perpetuity, the limit being sometimes 100 years, sometimes only 50; after which it devolves to the State, which also preserves a right, in almost all cases, to purchase the property before those periods are expired.

Another safeguard to the public consists in the common practice of the State taking a very large proportion of the shares in the undertaking, perhaps one-fourth, and obtaining an influence in the management proportioned to its holding.

Still, it may be expected, that such extensive uncontrolled power in the Companies, will be found to be attended with very inconvenient effects, and another evil may be apprehended from the independent and distinct jurisdiction of the different States of the Union, that jealousies and want of concert may arise in the operations of a Railway which passes through more than one of them.

It is said that difficulties were very early experienced in the States, on the subject of the conveyance of the Mails, by Railways; and that the Post Office, as one remedy, were driven to the expedient of sending the Guard as a passenger with the bags as luggage; but it is plain that such a mode of conducting so important a service could not be tolerated for any length of time; and it would be interesting to know whether these Companies have the power of making the Post Office conform to whatever conditions they may please to impose upon them, or what remedy has been resorted to in that matter.

The French have used great foresight and precaution in the principles they have adopted for the protection of the public interests.

The first great projects are drawn up under a principal department of the Government, at the public expense, in order to avoid the confusion and imperfect measures that may be originated by partial views, or by the spirit of individual speculation.

Opinions are formally courted from the portion of the public who may be supposed to feel a peculiar interest in the undertaking; and that the result has been the selection of measures best suited to the country generally, may be inferred from the inconsiderable degree of opposition that has been made to the plans as they were finally brought forward.* They are then divided into portions, each comprehending the entire of a line between one great point and another, including some of 100 or 200 miles in extent.

An Act is then proposed in the Legislative Chambers, for any one of these undertakings, in which the nature of the work is defined, as well as all the terms and conditions to which any party undertaking them will be liable, and the powers and advantages that will be given to them. The measure is discussed, and if approved, it is then open

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* This is a feature well worthy of attention; that notwithstanding all the opposition raised against the Government proceedings generally, in this measure of Railways, the propriety of the lines laid down on extended views, embracing the whole country, was never disputed; or, at least, was only the subject of some proposed modifications in the detail, the relative advantages of which were calmly discussed, and finally adjusted without much difficulty.

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to the biddings of capitalists, and consigned to such duly qualified parties as offer the most favorable terms.

The inducements held out to the capitalists, or parties wishing to embark in the undertaking are :—

1. The surveys and particulars of the project and valuations ready prepared, and sufficiently in detail to enable them to be thoroughly considered and acted upon;

2. The Act of Incorporation given to them;

3. All the powers and advantages usually given for the encouragement of great public works, to facilitate the procuring of materials and conveniences, and for the regulation of labour;

4. The co-operation of the Government Departments connected with public works, and which were engaged in directing the first investigations;

5. A power to levy tolls;

6. And the offer of a contribution, not exceeding a given sum, amounting, in some cases, to one quarter of the estimate.

Amongst the conditions with which the Companies are usually required to comply, are the following :—

1. A limited period of possession, generally for 99 years—sometimes only for 50—after which the establishment is to be given up in a good condition, with all its works, premises, buildings, &c., to the State; the engines, carriages, and other moveables to be taken at a valuation;

2. The State reserves a right to purchase the Railway, at a fair value, after a given number of years' possession;

3. The Tolls are defined and fixed at moderate rates;

4. The nature of the works is defined; and the system for drainage of country, fences, the manner of crossing roads and navigations, the limits of curves and gradients, number of lines of rails, strength of rail, &c., &c., and the works are to be subject to examination and approval;

5. A Tax to be paid to the Government of one-tenth, on the amount received for Passenger traffic, exclusive of the amount charged for Tolls, or profit on capital;

6. The Mails and Despatches, with their Guards, to be carried free of charge;

7. The Military, when on duty, to be carried at half-price;

8. Every facility to be given, in cases of necessity, to the removal of large bodies of Troops or Military Stores;

9. The Police, the preservation of the Railway, and safety of its working, and the regulations in general, to be subject to the control of a Public Department;

10. And sometimes the profits limited to 10 per cent.

On these terms, many offers have been made to undertake Railways of considerable extent, and, in lines promising peculiar advantages, even without demanding any of the Government contribution.

In contradistinction to this extreme limitation of powers, it may be worth while to advert to some of the consequences of the other extreme, as experienced in England.

The plan of a Railway in these countries originates, as already mentioned, in nineteen cases out of twenty, with an Engineer, Solicitor, or other ingenious projector, who conceives and draws up a proposition calculated to be attractive.

The plan is laid before a certain number of capitalists and associates, who form a Company, collect a sum of money for the purpose of proceeding with detailed Surveys and the preparation of a Bill.

When arrived at that point, the Engineer, the Solicitor, and the salaried Agents obtain very lucrative employment.

The Survey is made, prospectuses and advertisements issued, and the Share list filled up, chiefly by parties who look to profits by dealing in Shares.

This list is filled with more or less facility, according to the attractions held out, and likely to be maintained for the necessary period; frequently the influence and reputation in such concerns of the Engineer or Solicitor, will be sufficient for the purpose.

The Bill is presented to Parliament; and if it be strenuously opposed, particularly by a rival company, then commences the rich harvest of Counsel,

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Powers and Restrictions on Companies.

Solicitors, Engineers, and persons summoned and retained in London for the purpose of giving evidence: discussions are entered into respecting every abstract professional matter connected with Railways: the principles of curves and gradients, of friction and gravity, are investigated—questions on which, in many cases, the counsel, the witness, and the court, are all equally ignorant. Then a formal effort may be made, and perhaps with success, to reject a measure, after an expenditure of tens of thousands of pounds, not on account of some very essential grounds of objection, but frequently for some such trivial cause as that a notice to the proprietor of a small piece of waste land was left at No. 23, instead of No. 24, in a given street.

Thus a project, though possibly of great value, (for that does not alter the case,) may be defeated for two or three sessions of Parliament, having the whole to recommence each time; and the same process would have to be gone through before the Committee of each House, but that the Lords do not admit of so discursive a system.

After the Company has once battled its way, at an enormous expense, through Parliament, it has still to contend under many disadvantages with the landed proprietors and others to whom compensation is to be made; after which it has its own way, and is in a condition to make reprisals upon the public for all these unnecessary expenses and vexations.

The restrictions and terms for the protection of the public interests, after the project has been set at work, are few and nugatory. Every thing seems then to be abandoned to the Company; though after all, the researches of others may perhaps show this first project to be imperfect in many points.

These are among the natural consequences of leaving such undertakings (according to the received popular notions,) entirely to the exertion of private capital, ingenuity, and enterprise, when it is manifest that the projects thus urgently enforced are often taken up for mere temporary objects, and that the great body of the same parties, having made their account of them, will readily enter upon others whose only prospect of success may depend upon the ruin of the first.

It would be difficult to provide against many of the inconveniencies and great evils that have been pointed out in this paper, without adopting rules and principles repugnant to received opinions in this country; but they are of such serious consequence, that they must be resolutely grappled with.

Several remedies in detail have been already referred to.

As many safeguards as can reasonably be introduced into the Acts of Incorporation, should be inserted in every succeeding Act. This, however, will but imperfectly meet the exigency, and some measure of a more arbitrary character will be requisite, if such can be admitted—something in the nature of a Board of Control, to whose sanction the proceedings of all Companies, to whom Railway Acts shall be granted, should be submitted.

Such a Board should be composed of that class of individuals to whom it may be thought most safe to entrust the authority; their acts being made subject to every degree of restriction, superior sanction, and publicity, that may afford the greatest security against their exceeding a proper discretion.

This controlling body might be easily restrained from any captious or unnecessary interference; whilst a reasonable watchfulness over the whole concerns would not only obtain certain advantages for the public, but be of service to the body of Shareholders themselves, even although such superintendence might not be pleasing to the managers.

Whatever objection may be raised to this proposed remedy, or whatever difficulty might be found to its organization, the evil itself should not be lost sight of; some mode of correcting it is absolutely necessary.

Remarks on the Standing Orders of the two Houses of Parliament.

REMARKS ON DETAILS REGULATED BY THE STANDING ORDERS OF THE TWO HOUSES OF PARLIAMENT, AS THEY AFFECT THE CONSTRUCTION OF RAILWAYS IN IRELAND.

Publication of Notices.

1. It is required, by order of the Commons, but not of the Lords, that Notices be published with regard to Railway Bills, (and only to them) in the months of February and March preceding the Session of Parliament, in which application for the Bill is to be made. These Notices must consequently be published *a year* before the petition for the Bill is presented, which is particularly inconvenient for Railway projects, which require a long time to prepare.

The object is, no doubt, to insure adequate notice being given; but it is presumed that the same period of four or five months, within which notices of all other private Bills are allowed to be given, and the same period for the decision in Parliament would be ample for the purpose; and more especially as application to owners and occupiers may be made so late as any time before the 31st December.

The effect of this order must be to check and repress speculation in a great degree, and perhaps it was designed for that purpose; but in Ireland, it is an object of paramount importance to encourage the investment of Capital in all undertakings of acknowledged public utility.

It is most just and proper that all due publicity be given of the intention to seek powers to interfere with private properties and rights; and the most efficient mode of doing so will be to publish the notice first in the Gazette and Newspapers specified; not a twelvemonth prior to the Petition, (an interval so long as to set vigilance asleep, if not to lead to total forgetfulness of the subject) but within a more reasonable period of two or three months; and further, to circulate bills printed legibly, with a heading in conspicuous characters, and affixed to the doors or walls of churches, chapels, market-houses, and police stations; no omissions, however, in point of form to be deemed an obstruction to the measure, unless they amount to a wilful and palpable neglect of this order, or appear strongly indicative of design.

The order, at present, only requires that notices shall be fixed on parish church doors, and does not define the character of the document, which may be in writing, and most difficult to read.

Application to Proprietors, &c.

2. Application in writing is required to be made to the owners, lessees, and occupiers, interested in any land or property, with which it is proposed to interfere.

To comply strictly with this regulation in Ireland, where interests are multiplied, and extended to a very great degree, would be most difficult, if not impossible.

It is understood, that in point of fact, Parliament is not in the habit of throwing out Bills on account of any defects in such applications, unless there shall appear to be gross and wilful negligence in the case; but it would appear equitable to relieve Companies from vexatious opposition on such grounds, by allowing them to charge any specified parochial or public authority with the obligation to perform this service; the Companies, of course, providing the necessary information of the details of the localities and circumstances, and defraying the expense.

Such an arrangement would insure the service of due notice upon distant parties concerned, by their giving advice of their respective interests and their address to the authorities so named, who might be required to register them in books of reference.

Descriptions on Notices.

3. The notices are to contain the names of Parishes and Townships.

In Ireland, the Townland is that which most nearly resembles the English Township, but it does not strictly correspond to it.

But the Townlands are ill-defined, and very difficult to ascertain, except in those counties of which the great Ordnance Survey has been printed. The division, also, being minute, adds very considerably to the cost of advertising.

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Remarks on the Standing Orders of the two Houses of Parliament.

It might, therefore, be reasonable to limit the enumeration of the Townlands to those counties of which the Ordnance Survey had been published; allowing the names of the parishes alone to be sufficient, where that authentic guide is wanting, and not requiring the Townlands to be mentioned in the advertisements at all, but to be inserted in the printed notices that are required to be affixed to the buildings.

Descriptions on Notices.

In the Lords' regulations, a useful schedule for notices is given, easy to be filled up; but to owners and occupiers of large holdings in particular, tracings from the plan and section might be added.

Scales for Plans.

4. The Plans are to be on a scale of not less than 4 inches to a mile.

For Ireland, it would be advisable to enforce a uniform scale of 6 inches to the statute mile, that being the scale of the Ordnance Survey, a work of very great accuracy, of which the maps of 15 counties have been already published, and the remainder are in rapid progress.

Combining Plan and Section.

It is questionable whether combining plan and section in the manner now defined be advantageous.

For the sake of reference, a corresponding mileage divided into quarter miles in conspicuous figures on plan and section, might be applied.

The combination of plan and section may occasionally be useful to an engineer or professional man, but amongst country gentlemen, farmers, &c., it might create a very erroneous idea, as the shading will, more or less cover rivers, gardens, and houses, which will consequently be supposed, as Mr. Vignoles states, to be immediately affected.

Scale for Sections.

It would be advantageous to enforce a uniform vertical scale for the section, as well as for the plan, as the eye would get accustomed to the scales, and it would be easier to draw comparisons. This vertical scale might be increased without inconvenience, to 80, or, perhaps, still better, to 60 feet to an inch.

It might be useful also to adopt, as far as possible, a uniform datum level, such as that employed by the Ordnance, where it can be conveniently applied.

The rate of inclination of each gradient, is required to be shown; this might be further defined, in order to establish uniformity, and to obtain as much information as possible by a sample, thus:—

Inclination, 16 *feet per mile, or* 1 *in* 330 *for* $4\frac{5}{8}$ *miles.*

The section should have a horizontal scale of miles and quarters, corresponding with similar figures on the plan, and the extreme depth of each cutting or filling should be figured, in addition to those at stated distances.

Buildings and close Grounds on enlarged Scales.

5. Some modification would appear desirable in the scales for the enlarged plans of buildings, court-yards, gardens, &c.

The scale defined, namely, one-fourth of an inch to every 100 feet, is sufficient for detached houses and gardens; for garden grounds generally, it might almost appear too large; but for close blocks of buildings in towns, villages, &c., it is too small. A uniform system, but of two or three different scales, suited to differently defined circumstances, might be an improvement.

It might be proper to add an enlarged section at the crossing of every road, street, or canal, &c., with transverse sections, showing the old and new approaches, and where any road is stated on the section, as intended to be diverted, the plan of the mode in which it is to be carried into effect, should be marked (in colour) on the maps, and a longitudinal section of the new piece of road given; this is very important, particularly in populous places.

In Ireland, where turnpike roads are not so general as in England, the expression should be turnpike or mail coach roads.

Periods for depositing the Plans.

6. Great practical inconvenience will arise, respecting the periods for depositing plans and sections, &c., with the different authorities.

To be enabled to lodge so many duplicate plans by the 1st of March, or 1st of April, the surveys and investigations must be made in the preceding autumn, that time may be allowed for complying with all that is required, and for engraving the plans and sections, which is necessary, in order to insure accuracy in the several copies; thus, two years must elapse, from the

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Periods for depositing the Plans.

time a Railway subscriber puts down his deposit, before the Act of Parliament is obtained. Parties wishing, for instance, to adopt at this time, any line recommended, must make their surveys in the ensuing autumn, 1838, lodge their plans, and give their notices in March, 1839; present their petition in February, 1840; and, supposing the Act to be obtained in that same session, they can hardly, under the most favorable circumstances, be at work with much activity till 1841.

This would be a great additional discouragement to the advance of capital for public works in Ireland.

It is very desirable, no doubt, that abundant time should be afforded to the engineer, for maturely considering the first project. The period so employed might be the means of saving the great expenses attending renewed applications to Parliament for further Bills, rendered necessary to amend the errors found in the first hastily drawn up plans; but this very early period for making them up formally, is attended with much inconvenience.

Deposit of 10 per cent. of the Capital.

7. The obligation to deposit 10 per cent. of the capital, in the first instance, is greatly objected to, and is said, after all, not to give the contemplated security.

To evade this provision a system has been adopted of bankers advancing the money. If the Bill fails, the banker gets his money back, with interest from the parties; the same if the Bill succeeds, and the 10 per cent., necessarily, does not remain applicable to the purposes of the Company, but, by the very terms of the order, may be paid back to the person nominated, who will, of course, be the party who advances the money, for which he gets interest and commission.

The public obtain no security against a bad scheme by this clause; but good ones may be crushed by it if the promoters cannot find speculating capitalists to assist them; and few subscribers will advance 10 per cent. to be so locked up, besides having to pay from 2 to 5 per cent. for surveys and other expenses, two years before an Act can be obtained.

It is confidently asserted, that most of the deposits to be made under this order in the present session, will be made by capitalists under the guarantee of the Directors, which is thought to be a good speculation, as they receive 5 per cent. from the Company for advances, which they can themselves procure at 2½ to 3 per cent. Nobody, in fact, is benefitted when the transaction is so conducted, except the banker and broker.

Period for signing Contracts.

8. Not allowing the validity of subscription contract, unless signed immediately preceding the session wherein the Act is to be brought in, is said to lead to trouble, expense, and hardship.

If a Bill be lost in one session it cannot be renewed in the next, on the same contract deed; and even in a new measure a valid contract cannot be signed until long after much expense has been necessarily incurred, by which the risk is to be thrown on a few individuals.

Power to make Alterations.

9. The power to make improvements in the lines might be facilitated.

There appears to be no good reason for limiting a proposed alteration to one mile in length; the endeavour to avoid infringing on that limit, may give rise to inconvenient junctions at the ends, or palpable improvements may be abandoned on account of the heavy cost of obtaining new powers. Some intermediate jurisdiction might, perhaps, be established under proper guards, to avoid the necessity for recurring to Parliament except on occasions worthy of its interference.

Power to Borrow.

10. Companies are restricted from borrowing an amount exceeding one-third of their capital, and from borrowing at all until 50 per cent. on the capital be paid up.

This provision should be modified for Ireland, so as to correspond to the degree of encouragement authorised by the Acts for the promotion of Public Works there.

Deviations from Section.

The limitations prescribed to deviations from the section, seem to be too strict, and might tend to prevent many very useful improvements in the execution, which would be really injurious to nobody, even although the deviation should greatly exceed 5 feet, while, on the contrary, a smaller

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deviation under some circumstances, might be prejudicial. The difficulty arises from the necessity of defining a fixed limit.

The limitation should prescribe that embankments should not be raised, nor cuttings sunk beyond a certain degree; the lowering an embankment, or reducing a cutting, might be made admissible to any extent.

Deviations from Section.

It is a question, whether the deviation should not be from the surface of the ground, and not from the datum level; if the same line be kept, the effect would be the same; but, by removing to a different level, what may be cutting in one respect, may be embanking in another.

Giving the owners, lessees, &c., of the land, the option of preventing such deviation, is giving them an undue power to extort heavy payments from the Companies when there may not be even a plea of injury. It does not follow, as a matter of course, that the owner or occupier of the actual piece of land traversed by the Railway is the party whose interest may be most affected.

It would be an improvement if there could be some authority or arbitration to sanction deviations in section, and to value the amount of injury done.

Limitation in deviating from Gradients.

The limitation in the gradients affects solely the subsequent working of the line; and the latitude given should be in proportion to the nature of the gradient: where it is not to exceed 10 feet in a mile there need be no limitation; from 10 to 21 feet in a mile, perhaps, a deviation of 5 feet might be allowed, and only where it exceeds 21 feet in a mile, the limitation to be fixed at 3.

The limitation with regard to curves requires modification. It is found by experience, that the passage of curves, even at high speed, is far less dangerous or inconvenient than was apprehended.

Curves of less than half a mile radius, are passed at the rate of 30 miles per hour without accidents. There may be additional wear and tear of carriages in consequence, but the extent is not known, and, at all events, that circumstance would not form so strict a subject for legislation.

Deviations in Curves.

There need certainly be no provision for curves exceeding one mile in radius, and even a reduction between one mile and half a mile radius might be admitted, if a great saving of expense, or other adequate advantage could be shown for it. A case has been before us, where, to obtain a curve of one mile radius, it has been necessary to carry the Railway, in plan, into the sea, which might be avoided by adopting a somewhat flatter curve.

With reference to the Standing Orders, in general, as regards power to deviate, it is most desirable that parties should be induced to draw up correct plans before they go to Parliament; but, however complete they may be as general plans, which is all that should be required, certain alterations and improvements will be suggested at very late periods, in working up the details; and a discretion should, therefore, be reserved to make such deviations from the original plan as may appear obviously beneficial, and, at the same time, consistent with the security and preservation of other interests.

The great want seems to be that of some investigating body, to report to the two Houses, and to whom Parliament might depute authority to decide on many cases of detail.

It might be useful to require copies of all Bills and Acts, and of such Plans, Sections, and other documents regarding Railways, as may be printed for Parliament or lodgment, to be deposited in the Public Works, or other office in Dublin.

They might be useful for reference; and the provision would be attended with very little expense or trouble to the parties.

The same power to enter lands, for making surveys for Railways, as is given for roads in Ireland, might be allowed under an order of two magistrates, security being given for the payment of any damage.

APPENDIX.

No. III.

REPORT

FROM LIEUTENANT HARNESS, ROYAL ENGINEERS,

EXPLANATORY OF THE PRINCIPLES ON WHICH THE POPULATION, TRAFFIC, AND CONVEYANCE MAPS HAVE BEEN CONSTRUCTED.

To Major H. D. Jones, R.E., Secretary to the Railway Commission.

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Principles on which Maps have been constructed.

Sir,—In compliance with the desire of the Commissioners, I have the honor to forward a description of the principles on which the Population and Traffic Maps of Ireland have been constructed; premising that they must be considered as statistical maps alone.

Population Map.

The first is intended to convey, at once, to the mind, an idea of the manner in which the population is distributed over the country; and for this purpose, the depth of shade applied to each part has been regulated by the density of that population. The Parliamentary Census of 1831, gave the number of the inhabitants; the Ordnance Maps, so far as they are published, gave the acreage of each barony; and for those not surveyed the Commissioners supplied the supposed areas. From these data, the number of inhabitants, per square mile, in each barony was determined, after deducting the population of the towns intended to be shown upon the Map, and the relative depth of shade for each barony was expressed by the numbers thus obtained. The towns are represented by dark spots, of which the areas are regulated by the number of their inhabitants.

It was at first proposed to abide throughout by the principle just described; but the Commissioners having expressed a wish that something more detailed than shading, by baronies, according to their average population, should be attempted, they marked upon a map, such barren tracts of bog and mountain as they knew to contain but few inhabitants; assigning also, from their general acquaintance with the country, what they supposed might be assumed as the population, per square mile, in such parts. The population of each barony, containing a portion of these boggy and mountainous tracts, was therefore considered, after allowing a few inhabitants to the barren parts, to inhabit the remaining portion, and the population, per square mile, deduced for that part, from the data thus furnished.

In order that definite information, respecting the population of the country, may also be afforded by this map, the number of inhabitants, per square mile, in different parts, has been engraved upon it in figures, and also the population, in 1831, of the different towns.

Traffic Maps.

The Traffic Maps are intended to exhibit, respectively, the relative number of travellers, and the relative weight of merchandise conveyed in different directions throughout Ireland.

Passenger Map.

They have been constructed, almost exclusively, from data supplied by the Constabulary. To obtain the requisite information for the passenger map, blank returns were sent to each Constabulary district, which, on being filled in, furnished a description of the public conveyances, passing each Police station, with the average number of their passengers; and from these returns, a list of public conveyances throughout Ireland was arranged. Besides the check arising from each conveyance being returned by at least two police stations, it has been further checked by returns obtained from Messrs. Purcell, Bourne, and Bianconi, the three largest coach and car proprietors in Ireland. The number of travellers between several places on the lines of road from Dublin, to Cork, and Limerick, has been also ascertained by Enumerators, whose observations have, in a great degree, corroborated the results obtained as above, and, at the same time corrected a few errors, caused by the same conveyance having been differently described at different stations. A few such errors may still remain, but it is believed that the numbers given on the map are a tolerably correct average of the number of passengers conveyed weekly, by public conveyances, between the places to which they refer; and as the number of such passengers may be considered a very fair proportional measure of the whole number of travellers, in any direction, the streams of shade, of which the breadths have been proportioned to those numbers may be considered as conveying a faithful picture of the relative amount, in different directions, of this description of traffic. The number of passengers conveyed by the boats on the Grand and Royal Canals, are correctly given, from very valuable returns furnished by the two Companies.

For the population, and for the existing passenger traffic, it has been possible to obtain definite information. With respect, however, to the merchandise conveyed between different parts of the country, it has been found absolutely impossible to obtain any precise knowledge. In England the turnpike receipts alone, reduced, by a little calculation, to a common standard of toll, would afford a fair relative measure of the inland traffic; but in Ireland there are so few, that it may be almost said there are no turnpikes. And after

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Principles on which Maps have been constructed.

inquiries in every direction, no return of trade was supplied that could be depended upon for accuracy. For the trade of the inland towns such returns, perhaps, were hardly to be expected; of those that have been received from different sources, for the same places, some return double and treble the amount of the same articles, returned by others; but, for the ports, correct returns of the actual tonnage of exports and imports might at least be expected, yet such it has been found impossible to obtain; for, since 1825, the intercourse between Great Britain and Ireland has been considered a coasting trade, and no records relating to it are kept.

Merchandise Traffic Map.

The map representing the traffic in merchandise cannot therefore be supposed to convey any definite idea of quantity; it gives, however, some idea of the general direction of the trade, and of the extent of country supplying or supplied by each port; and it has been attempted to make the breadth of the streams correspond with the relative amount of traffic, so far as a judgment could be formed.

The returns employed for determining the inland traffic were obtained from the Constabulary; these returns gave, as nearly as the several Constables could ascertain, or according to their judgment, the quantity of corn and meal, of butter, eggs, wool, cattle, &c., sent from the various market towns, to the different ports, for sale or exportation. They also stated what port each town was dependent upon for its supplies of heavy articles, such as iron, coal, and timber, together with the mode and cost of communicating with it. In some instances, too, the number of carts supposed to be employed, in a given period, between the port and the town was added. Since, generally speaking, no reliance could be placed upon the actual amounts of any of the articles returned, the direction of the trade was, at first, alone attended to, and a line for each stream of trade so returned was drawn upon a map; many towns, uniting to send their produce in the same direction, made these thick, and they, in fact, became wide in proportion to the number of towns that fed them. The whole map having been thus traced out, the streams of produce on the Grand and Royal Canals, which were found to bear very nearly the same proportion to each other, that their traffic does, as exhibited in Porter's Tables, were taken as equivalent to the number of tons shown by those tables, to be conveyed by them; this supplied a scale; those streams for which any thing like definite information respecting weight had been obtained, had their breadths corrected by that scale, and the others were left unaltered.

Returns from the Mining Company of Ireland, and other sources, have furnished the information relative to the weight and value of the produce annually obtained from the mines and quarries, as given on the map.

Returns, so far as the records of the Custom Houses could supply them, have been obtained of the Exports and Imports of each port, for the year 1835, together with an account of the tonnage of the shipping cleared and entered in 1825, 1835, and 1836; from these data numbers were assumed as affording a measure of the trade of each port, and these numbers were submitted to the several collectors, for their opinions; thus have been obtained the quantities assigned to them on the map.

These amounts finally determined upon, as fair measures of the trade of each port, must be considered then as supplying scales of comparison for the streams of traffic, and it would have been useless to attempt any thing more definite than this from the data that could be obtained.

Estimates.

As, however, the exports and imports are not true measures of the whole trade of the ports; and as it is desirable to know what the actual tonnage moved into, and out of each, may at present amount to, I shall now, in accordance with the wish of the Commissioners, submit the result of an estimate of the same, founded on a consideration of the population of each port, its Excise and Custom House Returns; and another of the traffic likely to fall upon the proposed line of Railway between Dublin and Cork, with its branch to Kilkenny.

Such estimates must necessarily be vague in their results, but they are not likely to be incorrect to the same extent when applied to Ireland, as they would be for other countries. Her inland traffic is almost exclusively confined to the conveyance of articles to and from the ports. She has no great manufacturing inland towns receiving a variety of materials from different parts, and returning their commodities in complicated streams for exportation, or consumption; with the exception of the trade occasioned by four collieries, as yet of small importance, the linen, and some cotton manufacture, in the northern counties, there does not appear to be any transit worthy of notice, of other than agricultural produce. The inland towns are only important in proportion as they offer good markets for such produce; and it is, in almost every case, to the facilities afforded by a navigation, that those of note owe their superiority. It may safely be said, then, that the only towns of real importance, in a trading point of view, are the ports; that the traffic of the country is confined, almost entirely, to forwarding agricultural produce to them, and receiving small supplies of imported articles in return.

Estimate of Inland Traffic, to and from the Ports.

By estimating the tonnage, entering and departing from the ports, it is attempted to show what the gross tonnage of the several streams of traffic, concentrated at each, may amount to; and the result, though most probably not true, as regards the actual trade of any town, must, nevertheless, give numbers expressing pretty fairly their relative commercial importance, or so far at least as a carrying trade is concerned.

The following general principles have been observed in forming this estimate:—

I. To the tonnage exported has been added the grain supposed to be consumed by breweries and distilleries; the food of the inhabitants, so far as it consists of Irish produce;

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an allowance for the keep of horses, considered in a certain proportion to the population; and an allowance for building materials, turf, and other articles: from the sum thus obtained has been deducted the amount of any articles of the above description included in the list of imports.

II. In estimating the grain consumed by brewers and distillers, from the general return of malt and spirits on which duty was paid in 1836, at the different towns in Ireland, it has been assumed that three-fourths of the malt was consumed in brewing, and that the spirits, where they exceeded the quantity that could be produced by the remainder of the malt, were distilled from corn not previously malted; a ton of grain has been allowed for 120 gallons of spirits; and a barrel of beer has been considered to be produced from every three bushels of malt used by brewers.*

III. From the data furnished by the population returns, it has been assumed, in determining the consumption of food, that 1000 inhabitants comprise 305 males, and 318 females, between the ages of 12 and 60; 39 aged, of both sexes; 184 children, between five and 12 years of age; and 154 under five. Supposing, then, the women, the children between five and 12, and the aged, to consume only three-fifths the quantity required by a healthy man; and the children under five years of age, only one-fifth of the same, it is found that 1000 persons, of general population, may be considered equivalent to 661 men; and, supposing one in 50 to be sick, and to consume only one-half their usual diet, this is reduced to 655 men.

It was also necessary to divide them into classes as consumers; and, perhaps, when it is remembered that the weight consumed is the point required, and not the quantities of particular articles, it will be deemed that a sufficient approximation has been made in assuming that one-tenth are unrestricted in their consumption, six-tenths obliged to limit their use of meat and other articles, and that three-tenths subsist entirely on vegetable food.

The quantity consumed daily, by a healthy man, in each class of articles of food of Irish production, has then been considered to agree with the following Table, the offal and waste of each article being included in the weights given:—

Articles.	1st Class.	2nd Class.	3rd Class.	Remarks.
	lb.	lb.	lb.	
Animal Food, exclusive of Fish	1	0½	–	Being 96 lbs., annually, per inhabitant.‡
Corn, Flour, and Meal - -	1¼	1¼	–	
Vegetables and Fruit - -	1	2	11†	
Butter, Eggs, Cheese, Milk, &c.	0½	0¼	–	
Daily Consumption - -	3¾	4	11	

The above makes 6.075 lbs. the average daily consumption of a healthy man, and according to the supposition that 1000 persons are equal to 655 males, an average of 3.979 lbs. for each inhabitant, which may be called - -	2-3rds ton annually
In England and Wales the number of horses not employed in husbandry, is equal to about one-fiftieth of the population, the same proportion has here also been assumed, and their daily consumption allowed for, at something more than 25 lb. per horse, making an addition, per inhabitant, of - -	1-12th
60,000 tons of stone, sand, bricks, and flags are conveyed annually, on an average, into Dublin by the Grand Canal; supposing the trade of the Royal Canal to comprise one-half that quantity, of the same materials, which is in proportion to their gross traffic, 90,000 tons of this description of materials may be assumed as the yearly demand of a town of 214,000 inhabitants, being for each	5-12ths
From the same data, for places where coal is largely imported, as in Dublin, the turf may be assumed at - - - - - - - -	1-3rd
Total - -	1½ ton annually.

The amount of Irish produce, exclusive of articles returned by the Excise, brought into each town for its own use, has therefore been taken at 1½ tons annually, per inhabitant, with a further allowance for turf where the importation of coal is small. There is no source from which the consumption of turf can be exactly ascertained, but it appears

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[*] It appears, from the Excise returns of 1835, that seven-ninths of the malt on which duty was paid, in that year in Ireland, were consumed by brewers and victuallers; and from those of 1836, it appears that only 91,308 gallons of spirits were distilled from malt alone, being about one eighty-fifth of the whole quantity returned by the Excise for that year: the remainder was made from mixed corn and malt, and the Excise officers suppose 19 gallons to have been obtained from each quarter of grain, or about 120 gallons per ton, supposing barley and oats to be principally used.—*British Almanack*, 1837. *Vide*, also, *M'Culloch's Dictionary of Commerce*—Articles, *Ale* and *Beer*, and *Malt*.

[†] Eleven pounds of vegetable food must seem enormous for the daily consumption of one person; yet, from the information obtained upon this subject, it appears impossible to estimate the potatoes consumed by a healthy working man at a lower rate.

[‡] The consumption of butchers' meat in London is supposed to amount to about 140 lbs. annually, per inhabitant, including offal; in Glasgow, to 130 lbs., and in Paris and Brussels, to 120 lbs. The condition of the Irish people warrants the belief that this difference is not too great.

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probable, that for any town where it is exclusively used, about 4½ tons must be required annually for each individual of its population.*

Estimate of Inland Traffic to and from the Ports.

IV. From the information afforded by the Excise and Custom House Returns, it has been ascertained what quantities of spirits, beer, and various other articles, are probably brought to each town by land carriage; and also what portion of each is retained for local consumption.

It has been found more difficult to estimate the trade from each town, and the results must be considered less satisfactory. The quantity of any particular article retained for consumption in Ireland, cannot be ascertained from the Custom House Returns of Exports and Imports in 1835; for, not only the amounts there given are not to be relied upon, but a very large portion also, both of exports and imports, is undescribed, being stated generally, as "Other Articles." It has been attempted, therefore, to infer, from the proportion which the average weight imported at each place, exclusive of coal, bears to the average importation of the kingdom, and, also, from the quantities received of particular articles, where the returns relating to them could be trusted, what proportion the population of the district dependent upon each port, bears to the port itself; and a corresponding proportion of the imports, exclusive of coal, has been considered to be carried from the town. The coal has been deducted in this consideration, although it forms nearly two-thirds, by weight, of the total imports of Ireland, because it is not an article of general consumption.

To the proportion of imports, assumed as above, has been added the surplus produce of the breweries and distilleries; the surplus coal, after allowing from three-fourths to four-fifths of a ton annually for each person; the quantity remaining, of articles supposed to have been received by land carriage, after allowing for the consumption of the town; and one-fifth of a ton, per inhabitant, for manure. The last proportion being founded on the data afforded by the return of traffic on the Grand Canal, before alluded to, as being given in Porter's Tables.

The estimate founded on the foregoing principles gives the following results:

ESTIMATE of the INLAND TRAFFIC of the undermentioned TOWNS in IRELAND.

TOWNS.	Carried to the Town						Carried from the Town.				Total to and from the Town.	Supposed present Population.
	For Exportation.	For Consumption.				Total.	Proportion of Imports.	Surplus produce of Breweries & Distilleries.	Coal, Manure, &c.	Total.		
		Agricultural Produce.		Exciseable, Shop, and imported Articles, not received by direct importation	Stone, Lime, Turf, &c.							
		By Population, as Food.	By Breweries & Distilleries.									
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
Dublin - -	72,000	160,500	23,000	2,000	160,500	418,000	118,000	12,400	231,600	362,000	780,000	265,000
Belfast - -	52,000	47,250	10,450	350	47,250	157.300	93,000	7.000	107,000	207,000	364,300	63,000
Cork - -	80,000	82,500	15,000	1,200	82,500	261,200	72,000	12,600	55,000	139,600	400,800	110,000
Limerick -	60,000	52,500	5,500	1,000	113,000	232,000	15,000	3,400	14,000	32,400	264,400[a]	70,000
Waterford -	110,000	21,750	1,700	600	21,750	155,800	28,300	3,000	48,700	80,000	235,800	29,000
Galway - -	20,000	27,000	3,700	500	148,000	199,200	4,200	2,500	7,200	13,900	213,100[b]	36,000
Londonderry -	37,000	7,950	5,350	150	7,950	58,400	54,400	4,800	8,300	67.500	125,900	10,600
Drogheda -	37,500	12,900	4,300	100	12,900	67,700	8,200	4,200	27,500	39,900	107,600	17,200
Sligo - -	25,000	13.500	1,950	1,000	51,000	92.450	5,200	1,400	3,600	10,200	102,650[c]	18,000
Newry - -	30,000	10,950	1,700	100	10,950	53,700	31,300	1,100	18,600	51,000	104.700	14,600
Dundalk -	34,500	7,875	5,000	100	7,875	55,350	3,000	5,800	19.600	28,400	83,750	10,500
Wexford -	30,000	9,000	5.000	300	9,000	53,300	10,200	1,300	22,400	33.900	87,200	12,000
Youghal -	23,000	7,500	–	900	7,500	38,900	200	–	32,500	32,700	71,600[d]	10,000
Tralee - -	8,000	7,950	600	600	37,950	55,100	500	400	2,200	3,100	58,200[e]	10,600
Ballina - -	8,000	4,500	200	600	26,000	39,300	500	400	1,200	2,100	41,400[f]	6,000
Ross - -	8,000	3,975	1,300	100	3,975	17,350	4,000	1,600	21,700	27,300	44,650	5,300
Ardglass and Killough -	10,000	1,800	–	100	1,800	13,700	20	–	2,800	2,820	16,520	2,400
Wicklow -	16,000	2,025	250	600	2,025	20,900	700	–	5,800	6.500	27,400[g]	2,700
Bantry - -	1,100	3,450	–	600	21,450	26,600	350	–	900	1,250	27,850[h]	4,600
Kilrush - -	6,000	3,225	–	500	21,225	30,950	100	–	850	950	31,900[i]	4,300
Westport -	14,000	3,375	1,000	50	7,000	25,425	1,860	840	900	3,600	29,025[k]	4,500
Ballyshannon -	1,800	2,850	1,100	300	11,350	17,400	500	800	760	2,160	19,560[l]	3,800
Kinsale - -	900	5,625	100	500	5,625	12,750	200	–	9,400	9,600	22,350	7,500
Coleraine -	7,500	4,650	300	50	7,850	20,350	4,000	200	1,300	5,500	25,850[m]	6,200
Donaghadee -	9,000	2,325	–	300	2,325	13,950	100	–	3.500	3,600	17.550	3,100
Dungarvan -	7,500	5.400	400	350	5,400	19,050	2,000	800	6,000	8,800	27,850	7,200
Larne - -	3,000	2,025	–	650	2,025	7,700	250	–	7,700	7,950	15,650	2,700
Ballycastle -	500	1,350	–	150	7,950	9,950	340	–	360	700	10,650[n]	1,800

[a] Including 60,500 tons of Turf. [b] Including 121,000 Tons of Turf. [c] Including 37,500 Tons of Turf.

[d] There is a Brewery in this town, but the quantity of Malt returned as having paid duty in 1835, is very small, and the Excise and Customs Returns agree in showing a considerable importation of Ale and Beer.

[e] Including 30,000 Tons of Turf. [f] Including 21,500 Tons of Turf.

[g] Corn is malted here, but it does not appear that there is either a Brewery or Distillery; the Malt is probably sent to Bray.

[h] Including 18,000 Tons of Turf. [i] Including 18,000 Tons of Turf. [k] Including 3,625 Tons of Turf.

[l] Including 8,500 Tons of Turf. The Fisheries in Killibegs Bay cause considerable traffic in this neighbourhood during the Herring season. [m] Including 3,200 Tons of Turf. [n] Including 6,600 Tons of Turf.

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* The various experiments that have been made on the heating power of different fuels, prove good

Estimate of Inland Traffic to and from the Ports.

The great differences observable in the proportion between the trade from, and that to a town, as for instance, in comparing Belfast with Limerick, or Tralee with Ross, is sometimes owing to one town using turf for fuel, which causes a large traffic to the town, while the other imports coal largely, causing a traffic from the town, and sometimes to a great disproportion in the tonnage of its exports and imports.

No allowance has been made for commodities conveyed through a town, or for articles twice moved, as with flax brought to Belfast to be spun, and then returned to the country weaver. But the items considered in forming the estimate, being the great branches of traffic, it is not supposed that the above would cause any important difference in the numbers by which such traffic is expressed.

The allowance for building materials is necessarily vague; it is probably low for Dublin, a paved and well built city, yet high for other inferior towns. It would vary with the rate of increase in the population of the town, and if a more exact estimate on this point were at any time required, it is probable that by considering the rate of that increase, the nature of the houses, and the condition of the streets, in each case, a tolerably correct result might be obtained.

Estimate of Traffic on the proposed Railway from Dublin to Cork.

With respect to the traffic likely to be carried on upon the proposed line of Railway between Dublin and Cork, it has been attempted, in the absence of real information respecting the trade of the country in its vicinity, to arrive at some conclusion, by tracing out the district likely to employ it, and then estimating the production and consumption of different portions of that district, from general averages, in the following manner; the desire throughout having been to obtain a result below, rather than above the truth.

If from a port, a line of Railway, or a Canal, be carried into a country, the whole of the surplus produce of which could find a market at that port, and there were no competing facilities for communication on the right and left of such line, or natural barriers impeding merchandise being brought to it; it may fairly be assumed, that it would receive the traffic of the country, to the right and left, from distances increasing as the distance from the port increased, but depending on the relative expense of the ordinary land carriage, and that by such Railway, or canal; the limit being the distance at which the land carriage to the line, together with the conveyance upon it, became equal to the expense of land carriage to the port.

Now in the districts referred to, and indeed in Ireland generally, the charge for the land carriage of heavy articles is returned as being about 6*d.* per ton per Irish mile; but a great part of the produce of the country is purchased by jobbers, who are satisfied with a very small profit, beyond the actual cost of conveyance, from the place of purchase to the place of sale, by their own horses and carts; and it does not appear that such cost exceeds 6*d.* in any part of Ireland; 4*d.* per statute mile, being more nearly the average, while it falls in some places, where there are good return loads, to less than 3*d.* In many parts of Ireland, in fact, a horse and cart can be hired for 2*s.* 6*d.* per day; at that rate, supposing 15 cwt. to be drawn 15 miles each day, the expense, per ton, per mile, is 2⅔*d.*, if only half return loads be allowed, the cost is 3⅗*d.*, and with no return load 5⅓*d.*; but it is possible in the last case, a distance, which requires three days with a loaded cart, would be performed in two days when returning without burden; and that this sum should therefore be reduced to 4⅘*d.* That land carriage in Ireland is as low as the amounts above given, may be inferred also from the fact, that some of the trade, between Dublin and the west of Ireland, is carried on by land, in preference to the Royal Canal; the charges upon which appear from the returns made by that Company, to be between 2*d.* and 3½*d.* per ton, per mile. Another useful fact may be quoted from the Constabulary returns; the charges from Bagnalstown, and Goresbridge, to Dublin, by the Barrow Navigation, amount to 18*s.* 3*d.* per ton, but a drawback of 3*s.* 4*d.* per ton is allowed on all goods brought nine miles by land; and it may be supposed therefore that the Canal expenses, together with nine miles land carriage, are nearly equivalent to the cost of land carriage altogether, from that neighbourhood to Dublin; making the latter between 3½*d.* and 3¾*d.* per ton, per mile.

A Railway, offering the advantage of more speedy transit than common carts, which is not the case with a Canal, would be almost certain to receive all the trade of that district, within which it also proved more economical to employ it; and if the charge be supposed to be 2*d.* per ton per mile, which to allow for the fare of a person accompanying the goods and two changes of conveyance, one at the place where it receives the merchandise, the other at that of delivery, may be considered a total expense of 2½*d.* per ton per mile; while that of land carriage is taken at 3½*d.*; the distance to the right and left, from which commodities would be brought to the supposed line, will be found to be a little more than one-third the distance from the port.

To ascertain the probable amount of agricultural produce forwarded from the district thus determined, the detailed accounts of exports from Ireland for several years prior to

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coal to be equal to about six times its weight of peat; now, the consumption of coal in Great Britain, exclusive of that required for her iron works, is supposed to average about four-fifths of a ton per inhabitant; this would be equivalent to 4⅘th tons of peat.

Again, Wakefield, in his *Statistical and Political Account of Ireland*, states, 25 kishes of 24 cubic feet each, to be required for the consumption of a cabin for the winter, allowing 10 more for the remainder of the year, would make 35 kishes per family, which may be supposed to average five persons, this allows seven kishes annually per inhabitant; now the weight of a cubic foot of peat is stated, by Tredgold, to vary between 44 lbs. and 70 lbs., it is therefore probable that 12 cwts. is the average weight of a kish, and that seven kishes are equal to about 4⅕ tons.

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Estimate of Traffic on the proposed Railway from Dublin to Cork.

1826 have been referred to, and for that period her annual exportation may be thus stated:—

Oxen, . . .	63,000 Head.	Barley, . .	15,000 Quarters
Sheep, . . .	70,000 „	Oats, . .	1,500,000 „
Swine, . . .	70,000 „	Wheat, . .	283,000 „
Butter, . . .	24,000 Tons.	Other Grain,	24,000 „
Bacon, . . .	18,000 „	Flour, . .	19,000 Tons.
Beef, . . .	75,000 Barrels.	Oatmeal, . .	10,000 „
Pork, . . .	107,000 „		

These are equivalent to about 437,000 Tons, and supposing the increase since 1825 to be in proportion to the shipping cleared, the present exportation of the above articles may be considered to amount to 680,000 tons; and after allowing 20,000 tons for eggs, wool, flax, and potatoes, from the returns furnished by the Customs to the Commissioners, the total export of agricultural produce may be assumed, with tolerable confidence at 700,000 tons annually.

To this must be added the consumption of the population of the ports; that population may be considered 700,000, and their consumption with that of their horses, taken at three-fourths of a ton annually per person, make 525,000 tons.

It appears, then, that about 1,225,000 tons of agricultural produce are annually forwarded to the different ports, and the area of Ireland being about 20½ millions of acres, the average annual surplus per acre is about one-seventeenth of a ton; but if 3½ million acres be deducted for the larger tracts of mountain, bog, and water this surplus may be considered to be obtained from seventeen million acres, making an average of about one-fourteenth of a ton per acre.

The country through which the proposed line from Dublin to Cork would pass, being fully as fertile as any other part of Ireland, it is not probable that its surplus produce would fall below this general average, and one five-thousandth of a ton has been accordingly assumed, as the daily traffic occasioned by the transit of agricultural produce, for each acre of the district considered likely to employ the Railway.

From the ports, the same districts, nearly, would be supplied with the various articles of import; the difference being, that imported commodities are only received in large quantities by dealers in the towns; the return trade therefore has been determined by observing what towns fall within the prescribed limits, and the amount of population supposed to be dependent on such towns.

The total import of Ireland, exclusive of coal, divided among her population, would give one-fifteenth of a ton to each person, but it is most probable that the consumption of Dublin, Cork, and the other great ports, exceeds the general average; it can hardly be above the truth, however, to assume, that including shop goods, beer, and spirits of Irish manufacture, the return trade would consist of 1 cwt. annually of different descriptions of merchandise, for each individual of the population to be supplied; or a daily traffic of one seven-thousandth of a ton per person.

As with the heavy traffic, so also would the passengers for Cork, Dublin, or places along the line, resort to the Railway from different distances according to the length of their proposed journey; there would be two inducements for such preference, leading to different results, with respect to the distance from which the traffic would flow to it, viz., diminished expense, and increased speed; assuming the fare of the Railway to be 1¼*d.* per mile, and that by the usual cars and caravans to be 1½*d.*, passengers would employ it, with the first object, when their distance from the Railway was not greater than two-elevenths' their journey by the common roads; and assuming the speed by the ordinary conveyances to be seven miles per hour, that by the Railroad, including stoppages, which, as there probably would be but few trains, would require to be rather frequent, to be 15 miles per hour; and also that a saving of one-eighth of the time required for the journey would be a sufficient inducement to undergo the inconvenience of a change of conveyance, and risk of greater delay, by either missing, or having to wait for the train; it would result that passengers would come to it, with the latter object, from places distant more than one-third of their proposed journey, from the line.

It may, perhaps, be said that the traffic would flow obliquely to the Railroad, and that passengers, from the same place, by joining it at different stations, might perform their respective journeys either in the smallest possible time, or at the least possible expense; such, however, could hardly be the practical result of a Railroad; regular conveyances would be established to it, from the places that found it convenient to employ it, and these would generally run to the nearest station. To enter upon the subject more minutely would require the condition of the roads, and local peculiarities of each place to be considered, and be quite inconsistent with the character of the present estimate; this remark being only made to show that these circumstances were not overlooked.

With a wealthy community, it is most probable that increased speed would be a greater inducement than diminished expense; with a poor one, and particularly with an agricultural one, expense is more likely to fix a limit to the traffic, and it has therefore been so considered.

With respect to the number of passengers likely to be received at each station, the very valuable return obtained from the Grand Canal Company led to the method employed.

The towns for which that Canal is the best mode of conveyance, must be in very similar circumstances to those on which the Railway would depend; the fare by the Canal is something less than that assumed for the Railroad, but the increased speed of the latter may be

Appendix.
No. III.
Estimate of Traffic on the proposed Railway from Dublin to Cork.

considered as compensating the additional charge, and the passenger traffic on the one may be taken as a fair measure of that likely to fall upon the other.

Referring to the above return, it is found that the proportion of the population of the different places, going within any stated period to Dublin, diminishes very regularly as the distance from Dublin increases.

Thus, from Edenderry, distance 38 miles, the daily proportion is 1 in 427,
Philipstown, „ 50 „ „ 1 in 588,
Tullamore, „ 59 „ „ 1 in 854.

And these places have been taken as the measure for other places at the same distances; the Grand Canal being for them the most direct, as well as the cheapest line of communication to Dublin, which it is not for Rathangan, and other places; while with Ballinasloe, Athy, Mountmellick, and Kilbeggan, situated at the extremities of different branches of the navigation, the numbers are likely to be increased by passengers passing through from other towns.

From the Conveyance Returns obtained from the Constabulary, it may be inferred that

From Lucan, distant $7\frac{1}{2}$ miles, the daily proportion is 1 in 56.
„ Leixlip, „ $9\frac{1}{2}$ „ „ 1 in 58.
„ Celbridge, „ 14 „ „ 1 in 91.
„ Clane, „ 19 „ „ 1 in 140.

From Cork it appears by the Enumerators' Tables, that four persons daily go to Dublin by sea; allowing an average of nine for the two mails and other land conveyances, we find that at the distance of 160 miles the proportion is about 1 in 8,000.

From the enumerations made under and by the directions of the Commissioners, it also appears that the travellers by post and private carriages, are about one-fourth of those by public conveyances, and that the foot passengers on journeys average rather more than one-half of the same.

A Railway would probably receive all the former, but none of the latter.

From the foregoing the following proportions have been arranged, and employed in estimating the number of passengers between Dublin and the several places on or near the line.

At the distance of 10 miles, 1 in 50 daily.
„ 15 „ 1 in 70 „
„ 20 „ 1 in 120 „
„ 30 „ 1 in 220 „
„ 40 „ 1 in 340 „
„ 50 „ 1 in 470 „

At the distance of 60 miles, 1 in 700 daily.
„ 80 „ 1 in 1,200 „
„ 100 „ 1 in 1,800 „
„ 120 „ 1 in 3,000 „
„ 140 „ 1 in 4,500 „
„ 160 „ 1 in 6,000 „

The only examples that could fairly be referred to for fixing proportions for the numbers of passengers passing between the country towns situated upon the same great line of communication, are those given in the Grand Canal Return of passengers between the places before mentioned, viz.:—Tullamore, Edenderry, and Philipstown. For them the Canal affords a good and direct communication with each other, and not apparently competing with any regular land conveyances; but the intercourse between three places, near together, afforded hardly sufficient data to continue the estimate for passenger traffic upon this principle, and therefore, after allowing for the intercourse between those towns which have Cork for their port, and that city, at one half the number of passengers given by the above table for similar distances from Dublin, an addition of 50 per cent has been made to the sum estimated to be received from passengers, as an allowance for the travelling between towns upon and near the line, and for small parcels; this per centage being fixed by observing what proportion the number of passengers, from Tullamore and Philipstown, to places along the Canal, bore to those for Dublin; and considering them to be conveyed, on an average, one-third the distance to the latter place.

On the above principles the accompanying estimate is founded.

I hope the estimates, and the description of the principles on which the maps have been constructed may prove satisfactory to the Commissioners.

And have the honor to remain, Sir, your obedient humble servant,

H. D. HARNESS,
Lieut., Royal Engineers.

MEMORANDUM RELATIVE TO THE ESTIMATE OF TRAFFIC ON THE CORK AND DUBLIN RAILWAY.

The Enumerators' Tables give 176 as the daily average number of passengers, by land, in one direction, between Naas and Dublin; the Grand Canal return shows 30 to be the daily average, by water, between Sallins, Rathangan, Monasterevan, Portarlington, Mountmellick, Vicarstown, Athy, and Dublin: 11 go daily from Limerick, and four from Cork, by water, to Dublin: total, 221. The estimate now submitted, after including 18 for Tullow, Baltinglass, and Clane, makes the daily average, from and through Naas to Dublin, 306; being an addition of 30 per cent. to the above total: or, if the increase on the whole be compared with the travelling by land, the Canal traffic being considered equal to that which a Railway would receive, of 38 per cent. It is hardly possible that the increase, consequent to the construction of a Railway, should be less than this.

H. D. H.

ESTIMATE of the TRAFFIC that would be carried on upon the proposed LINE of RAILWAY between DUBLIN and CORK, with a Branch to KILKENNY.

ASSUMED STATIONS.	DESCRIPTION OF TRAFFIC.	DAILY TRAFFIC. Towards Dublin. Tons	DAILY TRAFFIC. Towards Dublin. Passengers.	DAILY TRAFFIC. Towards Dublin. Distance in Statute Miles.	DAILY TRAFFIC. Towards Cork. Tons	DAILY TRAFFIC. Towards Cork. Passengers.	DAILY TRAFFIC. Towards Cork. Distance in Statute Miles.	Equivalent, moved one Mile. Tons	Equivalent, moved one Mile. Passengers.
1. By the cross roads at Esker, one-half mile from Lucan, and 5½ miles from the Dublin terminus - - - - - - - -	For all the places between Mountmellick and Dublin, it is most probable that the Canal would be preferred for the conveyance of heavy goods to and from the first six stations; therefore, passenger traffic only is allowed. Passengers between Dublin—and Lucan, and Leixlip,	–	60	5½	–	60	5½	–	660
2. On road from Celbridge to Newcastle and Rathcoole; 1½ mile from Celbridge, 2 miles from Newcastle, 4 miles from Rathcoole, and 9¾ miles from Dublin, - - - - - - - - -	Passengers between Dublin—and Celbridge, Newcastle, and Rathcoole, - - -	–	40	9¾	–	40	9¾	–	780
3. On road from Naas to Clane; 2½ miles from Naas, 2 miles from Clane, and 17 miles from Dublin, - - - - - - -	Passengers between Dublin—and Naas, Clane, Newbridge, Kilcullen, Baltinglass, Castledermot, Carlow, Tullow, Athy, Leighlinbridge, and Bagnalstown, - - - - - -	–	96	17	–	96	17	–	3,264
4. On road from Rathangan to Kildare and Newbridge; 1 mile from Rathangan, and 31 miles from Dublin, - - - - - -	Passengers between Dublin—and Rathangan, and Kildare, - - - - - -	–	14	31	–	14	31	–	668
5. On road from Portarlington to Monasterevan; 2½ miles from Portarlington, 3 miles from Monasterevan, and 38¾ miles from Dublin, - -	Passengers between Dublin—and Monasterevan, and Portarlington, - - - - -	–	13	38¾	–	13	38¾	–	1,007
6. On road from Maryborough to Mountmellick; 2¼ miles from Maryborough, 3½ miles from Mountmellick, and 48¼ miles from Dublin, - -	Passengers between Dublin—and Mountmellick, Maryborough, Stradbally, Frankford, and Parsonstown, - - - - - - - - - - - - - -	–	26	48¼	–	26	48¼	–	2,509
	Between the sixth and seventh Stations the trade of the Kilkenny branch would fall upon the Line, and may be thus estimated, - - - - - - - - - - -	50	58	52½	15	58	52½	6,825	6,090
7. On road from Castletown and Mountrath; 1½ miles from Castletown, 3½ miles from Mountrath, and 58½ miles from Dublin, - - -	Surplus produce from 60,000 acres; imported articles and shop goods for the supply of 28,000 persons, and passengers between Dublin—and Mountrath, and Castletown, - - -	12	4	58½	4	4	58½	936	468
8. On road from Borris-in-Ossory to Rathdowney; 3 miles from Borris-in-Ossory, 4½ from Rathdowney, and 66 from Dublin, - - - -	Surplus produce from about 110,000 acres; imported articles and shop goods for the supply of 56,000 persons, and passengers between Dublin—and Rathdowney, Borris-in-Ossory, Roscrea, Nenagh, Shinrone, Johnstown, and Urlingford, - - - - - - - -	22	15	66	8	15	66	1,980	1,980
9. Three miles from Templemore on road to Templetuohy, 77¼ miles from Dublin, - - - - - - - - - -	Surplus produce from about 100,000 acres; imported articles and shop goods for the supply of 42,000 persons, and passengers between Dublin—and Templemore, - - - - - -	20	3	77¼	6	3	77¼	2,008	463
10. Three-fourths of a mile from Thurles, and 85¾ miles from Dublin.	Surplus produce from about 100,000 acres, imported articles and shop goods for the supply of 49,000 persons, and passengers between Dublin—and Thurles, Littleton, Borrisoleigh, and Limerick.	20	30	85¾	7	30	85¾	2,315	5,145
11. On road from Cashel to Tipperary; 1 mile from Cashel, 11½ miles from Tipperary, and 98 miles from Dublin, - - - - -	Surplus produce from about 100,000 acres; and imported articles and shop goods for the supply of 49,000 persons, to and from Cork, - - - - - - - - - - -	7	–	68	20	–	68	1,836	2,444
	Passengers between Dublin—and Cashel, Tipperary, Killynaule, and Fethard, - - - -	–	9	96	–	9	98		
	And between Cork—and Cashel, Killynaule and Fethard, - - - - - -	–	5	68	–	5	68		
12. One-half mile from Cahir, and 108¾ miles from Dublin, - -	Surplus produce from about 120,000 acres, and imported articles and shop goods for the supply of 68,000 persons, to and from Cork, - - - - - - - - - - -	9	–	57¼	24	–	57¼	1889	3,132
	Passengers between Dublin—and Cahir, Clonmel, Clogheen, Lismore, Tallow, Cappoquin, Dungarvan, and Youghal, - - - - - - - - - - - - - -	–	12	108¾	–	12	108¾		
	And between Cork—and Cahir, and Tipperary, - - - - - - - - -	–	5	57¼	–	5	57¼		
13. One mile from Mitchelstown on road to Limerick, and 125¾ miles from Dublin, - - - - - - - - -	Surplus produce from about 100,000 acres; and imported articles and shop goods for the supply of 42,000 persons, to and from Cork, - - - - - - - - - - - -	6	–	40¼	20	–	40¼	1046	1,237
	Passengers between Dublin—and Mitchelstown, Kilworth, Rathcormac, and Fermoy, -	–	3	125¾	–	3	125¾		
	And between Cork and Mitchelstown, - - - - - - - - - - - -	–	6	40¼	–	6	40¼		
14. On road from Doneraile to Castletownroche; 4 miles from Doneraile, 2¾ miles from Castletownroche, and 139 miles from Dublin, - - -	Surplus produce from about 70,000 acres; and imported articles and shop goods for the supply of 28,000 persons, to and from Cork, - - - - - - - - - - - -	4	–	27	16	–	27	540	710
	Passengers between Dublin—and Doneraile, and Castletownroche - - - - -	–	1	139	–	1	139		
	And between Cork and the two last places, - - - - - - - - - -	–	8	27	–	8	27		
15. In the town of Mallow; 145½ miles from Dublin, - - -	Surplus produce from about 160,000 acres, and imported articles and shop goods for the supply of 70,000 persons, to and from Cork, - - - - - - - - - - -	10	–	20½	32	–	20½	861	2,722
	Passengers between Dublin—and Mallow, Charleville, Killarney, Tralee, &c., - - - -	–	4	145½	–	4	145½		
	And between Cork—and Mallow, Charleville, Kanturk, and Newmarket, - - - -	–	38	20½	–	38	20½		
16. Cork, distance from Dublin 166 miles, - - - - -	Passengers between Cork and Dublin, - - - - - - - - - - -	–	18	166	–	18	166	–	5,976
RECEIPTS.—20,236 Tons of Merchandise conveyed one Mile, at 2*d*. - £168 12 8								20,236	39,505
59,257 Passengers, do. do. at 1¼*d*. - 308 12 7¼	Add 50 per cent. to Passenger traffic, for Passengers between intermediate stations, and for small parcels,							–	19,752
Estimated daily Receipts, - £477 5 3¼	TOTAL, - - -							20,236	59,257

ADDITIONAL ESTIMATES to include the TRAFFIC that would be carried on if either of the undermentioned BRANCH LINES of RAILWAY were constructed.

FROM HOLYCROSS TO LIMERICK.

ASSUMED STATIONS.	DESCRIPTION OF TRAFFIC.	DAILY TRAFFIC. Towards Limerick. Tons	Towards Limerick. Passengers.	Towards Limerick. Distance in Statute Miles.	Towards Holycross and Thurles. Tons	Towards Holycross and Thurles. Passengers.	Towards Holycross and Thurles. Distance in Statute Miles.	Equivalent, moved one Mile. Tons.	Equivalent, moved one Mile. Passengers.
1. Near Thurles, being No. 10 in the First Estimate,	Passengers between Limerick and Thurles,	–	7	40¼	–	7	40¼	–	563
2. Near Chadville, on road from Tipperary to Cappawhite; 104¾ miles from Dublin, 21¼ miles from Limerick, 5½ miles from Tipperary, and 3 miles from Cappawhite,	Surplus produce from 35,000 acres, imported articles, and shop goods, for the supply of 21,000 persons, and passengers between Tipperary, Cappawhite, and Cashel—and Limerick,	7	18	21¼	3	18	21¼	212	805
	And between the two first mentioned places and Dublin, for the additional distance only,	–	3	6¾	–	3	6¾		
3. On road from Pallas-green to Cappamore; 111½ miles from Dublin, 14½ miles from Limerick, 2½ miles from Pallas-green, and 2¼ miles from Cappamore,	Surplus produce from 35,000 acres, imported articles, and shop goods for the supply of 14,000 persons; and passengers between Pallas-green and Cappamore—and Limerick,	7	5	14½	2	5	14½	130	145
4. On road from Cahirconlish to Abington, 117½ miles from Dublin, 8½ miles from Limerick, 1¾ miles from Cahirconlish, and 3½ miles from Abington,	Surplus produce from 15,000 acres; imported articles and shop goods for the supply of 7,000 persons; and passengers between Cahirconlish and Abington—and Limerick,	8	6	8½	1	6	8½	34	102
5. Limerick, 126 miles from Dublin,	Passengers between Limerick and Dublin, for the additional distance by Railroad,	–	22	40¼	–	22	40¼	252	1,771
	And a portion of the heavy traffic now carried on by water between those places,	1	–	126	1	–	126		
								628	3,386
	Add 50 per cent. to Passenger Traffic, for Passengers for short distances, and small parcels,							–	1,693
	TOTAL,							628	5,079

RECEIPTS.—628 Tons of Merchandise conveyed one Mile, at 2*d.* per Ton, - £5 4 8
5,079 Passengers, do. do. at 1¼*d.* each, - - 26 9 0¾
Estimated additional Daily Receipts on the construction of the Limerick Branch, £31 13 8¾

FROM BETWEEN CASHEL AND CAHIR TO WATERFORD.

ASSUMED STATIONS.	DESCRIPTION OF TRAFFIC.	Towards Waterford. Tons	Towards Waterford. Passengers.	Towards Waterford. Distance in Statute Miles.	Towards Cashel and Cork. Tons	Towards Cashel and Cork. Passengers.	Towards Cashel and Cork. Distance in Statute Miles.	Equivalent, moved one Mile. Tons.	Equivalent, moved one Mile. Passengers.
1. Near Thurles, being No. 10 in the First Estimate,	Passengers between Waterford and Thurles,	–	2	55½	–	2	55½	–	221
2. Near Cashel, being No. 11 in the First Estimate,	Passengers between Cashel and Tipperary, and Waterford,	–	4	43	–	4	43	–	344
3. Half a mile from Clonmel, 115¾ miles from Dublin, 25¾ miles from Waterford, and 72¾ miles from Cork,	Passengers between Clonmel, Fethard, and Cahir, and Waterford,	–	14	25¾	–	14	25¾	–	786
	And between Clonmel and Dublin (additional distance),	–	5	6½	–	5	6½		
4. Two miles from Carrick-on-Suir, 14½ miles from Waterford, and 84 miles from Cork,	Passengers between Carrick-on-Suir and Dublin (additional distance),	–	3	74	–	3	74	–	1,528
	And between Carrick-on-Suir and Waterford,	–	20	14½	–	20	14½		
	And between Carrick-on Suir and Cork,	–	3	84	–	3	84		
5. Waterford, 98½ miles from Cork, and 141 miles from Dublin,	Passengers between Waterford and Cork,	–	8	98½	–	8	98½	–	1,576
								–	4,455
	Add 50 per cent. for Passengers, for short distances, and small Parcels,							–	2,227
	TOTAL,							–	6,682

RECEIPTS.—6,682 Passengers conveyed one mile, at 1¼*d.* each = £34 16*s.* 0¼*d.*;
Being the estimated additional daily Receipts on the construction of the Waterford Branch.

If both the above branches were constructed, and also the addition by which the Communication between Limerick and Waterford is rendered more direct, the following increase might occur:—

		Towards Limerick. Tons	Towards Limerick. Passengers.	Towards Limerick. Distance in Statute Miles.	Towards Waterford. Tons	Towards Waterford. Passengers.	Towards Waterford. Distance in Statute Miles.	Equivalent, moved one Mile. Tons.	Equivalent, moved one Mile. Passengers.
	Passengers between Clonmel and Limerick,	–	11	47½	–	11	47½	–	1,039
	Passengers between Carrick-on Suir and Limerick,	–	4	58½	–	4	58½	–	468
	Goods and Passengers between Waterford and Limerick,	2	9	73	2	9	73	292	1,314
	TOTAL,							292	2,821

RECEIPTS.—2,821 Passengers, at 1¼*d.* - £14 13 10¼
292 Tons, at 2*d.*, - 2 8 8
£17 2 6¼

In the First Estimate the traffic of the Kilkenny Branch was only included for the distance it passed over the Main Line. In order, therefore, to complete an Estimate of the Receipts for all the Lines under consideration, it is necessary to allow for the average distance the Goods and Passengers are conveyed on the Branch.

	Towards Dublin. Tons	Towards Dublin. Passengers.	Towards Dublin. Distance in Statute Miles.	Towards Kilkenny. Tons	Towards Kilkenny. Passengers.	Towards Kilkenny. Distance in Statute Miles.	Equivalent, moved one Mile. Tons.	Equivalent, moved one Mile. Passengers.
Taking, then, the quantities from the First Estimate, they may be fairly stated to be conveyed 20 miles upon the Branch itself,	50	58	20	15	58	20	1,300	2,320
Add 50 per cent. to Passenger Traffic, for the intercourse of places upon the Branch, with Kilkenny, and each other, and for small Parcels,	–	–	–	–	–	–	–	1,160
TOTAL,							1,300	3,480

RECEIPTS.—1,300 Tons of Merchandise, at 2*d.*, - £10 16 8
3,480 Passengers, at 1¼*d.*, - 18 2 6
£28 19 2

APPENDIX A.

No. 1.

REPORT

ON THE SEVERAL LINES OF RAILWAY THROUGH THE SOUTH AND SOUTH-WESTERN DISTRICTS OF IRELAND,

AS LAID OUT UNDER THE DIRECTION OF THE COMMISSIONERS;

BY CHARLES VIGNOLES, CIVIL ENGINEER, F.R.A.S., M.R.I.A., M. INST. C. E.

Appendix A.
No. 1.

Report on the South and South-western Lines of Railway.

TO THE COMMISSIONERS FOR INQUIRING INTO THE BEST SYSTEM OF RAILWAY COMMUNICATIONS THROUGH IRELAND.

GENTLEMEN,—I proceed to lay before you my Report upon the several Lines of Railway through the South and South-western districts of Ireland, laid out by me pursuant to the official letter from your Secretary of the 6th December, 1836.

I would, however, beg to observe, that the original instructions, particularly as to levels and sections, were, from time to time, very considerably extended by the Commissioners, with a view of obtaining results more in detail than appears to have been in the first instance contemplated; and, in accordance with after directions, I have had taken complete profiles of all the lines first and subsequently determined upon.

I have also to remark, that the whole of the out-door work was executed with very great rapidity, during the most inclement season of the year, and without the assistance of accurate documents; the only maps which could be procured, and especially those of the more difficult parts, being extremely defective in the delineation of the natural features and modern roads of the country, and grossly inaccurate in respect of the relative position of the important points.

I must, therefore, claim indulgence, if, in consequence of these difficulties, some points should in places be found imperfect. Before any of the lines recommended to your Commission are adopted, they should be carefully revised, and I have no doubt many improvements in the details will be effected, especially when, by the extension of the Ordnance Surveys, the engineer shall be enabled to avail himself of the valuable documents for such purposes, which that great national work affords.

The lines here reported on, except from Dublin to Sallins, cannot now be traced in sufficient detail on the imperfect plans attached to this Report; most of these plans were compiled in great haste from the old county maps and other documents, upon none of which are the recent improvements laid down; and, therefore, the leading points only of the Railways can be identified. However, the original measurements of the several lines, as chained and levelled, have been plotted on a large scale, and may be hereafter transferred to the Ordnance plans.

I am much indebted to the valuable hints and observations afforded me by Mr. Griffith, one of your honorable Board, particularly as to the great natural formation and geological characteristics of the districts. The suggestions of Mr. Griffith came to my aid when misled by the inaccurate maps.

Had I not previously given a great deal of time and attention to the subject of Railway lines through these districts, and collected materials as far as they were extant, of which I have availed myself where correct or applicable, it would have been impossible to have completed the operations in the field (westward of Sallins) within the limited time allowed.

The final Surveys between Dublin and Sallins were postponed until long after the other portions of the work through these south and south-western districts were finished. Manuscript copies of the Ordnance Maps, westward of Dublin to the vicinity of Naas, having been furnished me at the latter end of 1837, I was then enabled to have the very extensive and detailed levels previously taken verified and repeated, so as to determine with proper accuracy and certainty the most eligible line for the entrance of the Main Trunk Railway into Dublin, an object to which I had been desired to pay the greatest possible attention.

Appendix A. No. 1.

Report on the South and South-western Lines of Railway.

Principal Lines laid out.

The diagram sectional index, and the index map herewith sent, exhibit abstracts of the following lines laid out, viz. :—

1. Main Trunk Line.—From Dublin by Rathangan, Maryborough, and Thurles, to Holycross, 89¾ miles; computed from Inchicore Avenue, which is three miles from the General Post Office in Dublin. To the preceding distance, should be therefore added the entrance into Dublin, to the general terminus at Barrack-bridge, at the west end of the southern quays, an extension of 1¾ miles from Inchicore; making together 91½ miles.

2. Shannon Line.—From Holycross by Donaghill (near Tipperary,) and Cahirconlish to Limerick, 45½ miles; thence along the left bank of the Shannon to Tarbert, 33¾ miles; in all, 69¼ miles.

3. Cork Line.—From Holycross by Cahir, Mitchelstown, Mallow, and Blarney to Cork, 76¾ miles.

4. Berehaven Line.—From Blarney down to the Lee, near Ballincollig; thence by the Valley of the Bride River, to near Macroom, and by the Lakes of Inchygeelagh and Pass of Cummineer, to the head of Bantry Bay, at Glengarriff, and thence to Berehaven, 71 miles.

5. Limerick and Waterford Line; that is, adopting part of the Shannon Line, (No. 2,) eastward from Limerick, as far as Donaghill (near Tipperary), for about 23 miles; thence following a separate route, and passing the River Suir, near Golden, and crossing the Cork Line (No. 3,) about midway between Cahir and Cashel, and then falling into the course of the Railway originally proposed between Limerick and Waterford, at a point between Woodruff Demesne and Clonmel, being about 20 miles of line now laid out by me, besides (included in the estimates) 4 miles further to Clonmel, from which town either of the directions separately proposed by the late Mr. Nimmo, or by Mr. George Stephenson, might be followed to Waterford.

6. Kilkenny Line.—From the Main Trunk Line, (No. 1,) near Maryborough, passing by Abbeyleix and Ballyragget, to Kilkenny, 27 miles.

In all, nearly 360 miles of Railway Lines have been determined and laid out, exclusive of the numerous trial lines and transverse sections which it was found necessary to make; which latter will be sent in as Supplementary Documents.

Principles on which the Lines were laid out.

In laying out these lines, I have acted on the following principles, viz. :—to ascend and descend with as much uniformity of gradient, or rate of inclination, as the face of the country would admit, with a due regard to economy; to seek the lowest passes in the ridges, and to surmount them with as little excavation as possible; to cross the streams and rivers as far up as was consistent with the general direction of the lines, and with the smallest extent of embankment, and to limit the profile of the Railway to the rate of 1 foot vertical rise or fall, to 330 feet horizontal distance, (16 feet per mile,) a rate of inclination which, for all practical purposes, may be said to be very good for passenger traffic, and not unsuited to merchandize trains, such as will probably pass over these lines. In fact, the above is the prevailing rate of inclination which has been acquired on the Railway between London and Birmingham at great expense.

It having been my endeavour to fix the inclination of 1 in 330, as a *maximum*, such gradient only occurs occasionally. On the Main Trunk Line, from Dublin to Holycross, the aggregate extent of this slope constitutes only one-eighth part of the whole distance; this fraction of the entire length occurring in three separate places, and, if considered of sufficient importance, even these might be reduced to 11 or 12 feet per mile, by additional earth-work.

It will be found then (with the very few qualifications which will be specially observed in the proper place,) that, for the Main Trunk Line, a distance of about 90 miles; for the whole of the Shannon Line, a distance of nearly 70 miles; and for the greater portion of the Cork Line, that is, as far as Mallow without break, 56 miles, and for six miles near Cork; for 50 miles of the Berehaven Line; and for nearly all that portion of the Limerick and Waterford Line laid out by me, viz., for 18 out of the 20 miles from Donaghill, near Tipperary, to the junction with the original line of Railway from Limerick to Waterford, some miles to the westward of Clonmel; and for the entire of the Kilkenny Branch, 27 miles; no inclination will exceed 1 in 330, or 16 feet per mile, and the generality will be much less; while 15 miles between Cork and Mallow, and 18 miles between Blarney and Glengarriff, are the extent of heavy gradients.

Such are my original conceptions and mode of laying out the lines entrusted to me; but it will be found that I have likewise prepared and estimated for a system of reduced or inferior gradients, which will insure a considerable saving of expense of construction in the first instance, should such be considered advisable or unavoidable under the existing circumstances of the traffic and intercourse of the country.

Appendix A.
No. I.

Report on the South and South-western Lines of Railway.

Plans accompanying this Report.

The following are the Lists of the Plans and Sections which accompany this Report.

PLANS.

INDEX MAP.

PLAN, No. 1* Enlarged Plan from Dublin to Celbridge Commons. } Entrance into Dublin.

	No.	Plan	Line
—	1.	Dublin to Naas.	Main Trunk Line.
—	2.	Naas to Castletown.	
—	3.	Castletown to Holycross.	
—	(a) 4.	Holycross to Donaghill, near Tipperary	Shannon Line.
		Holycross to Cahir	Cork and Waterford Lines.
		Donaghill near Tipperary, to Clonmel	Limerick and Waterford Line.
—	5.	Donaghill, near Tipperary to Limerick.	Shannon Line.
—	6.	Limerick to Tarbert.	
—	7.	Cahir to Mallow.	Cork Line.
—	(a) 8.	Mallow to Cork.	
		Blarney to Inchygeelagh.	Berehaven Line.
—	9.	Inchygeelagh to Berehaven.	
—	10.	Enlarged Plan of Glengarriff Bay.	
—	11.	Cahir to Clonmel and Waterford.	Limerick and Waterford, and Dublin and Waterford Lines.
—	12.	Maryborough to Kilkenny.	Kilkenny Line.

All the above Plans, except No. 1* and No. 10, are drawn to a scale of one inch to a Mile, and have diagram sections on the same horizontal scale, the vertical scale being 200 feet to an inch.

SECTIONS.

Sections accompanying this Report.

DIAGRAM INDEX TO THE SECTIONS.

	Section	Line
Section A.	Dublin to Maryborough summit; in 7 sheets.	Main Trunk Line.
— B.	Maryborough summit to Holycross; in 5 sheets.	
— C.	Holycross to Limerick; in 5 sheets.	Shannon Line.
— D.	Limerick to Tarbert; in 4 sheets.	
— E.	Holycross to Mallow; in 7 sheets.	Cork Line.
— F.	Mallow to Cork; in 3 sheets.	
— G.	Blarney to Inchygeelagh; in 4 sheets.	Berehaven Line.
— H.	Inchygeelagh to Berehaven; in 5 sheets.	
— I.	Tipperary to Clonmel; in 3 sheets.	Limerick & Waterford Line.
— K.	Maryborough to Kilkenny; in 4 sheets.	Kilkenny Line.

DIAGRAM SECTIONS of the preceding lines with REDUCED GRADIENTS.

All the above except the Index Sections, are drawn to the present Parliamentary scale for such documents, viz.:—four inches to a mile, horizontal scale, and 100 feet to an inch vertical scale; with the rates of inclination and their respective lengths marked; and all are referred to the same datum, viz.:—to the level of the top of a 12 foot tide, or the ordinary high water spring tides in the Bay of Dublin.

I beg leave in this place respectfully to observe, that in order to insure a proper uniformity in the plans and sections of future Railways through Ireland, it would be desirable, so far as relates to this country, that the Standing Orders of both Houses of Parliament should be modified by compelling parties making application for Railway Bills, (and it would be equally advisable in respect of all public works, where documents are to be lodged,) to lay down the plans which they are required to deposit, on the scale of the Ordnance Maps of Ireland; viz., six inches to the mile, and that no other scale (except for the enlarged portions through towns, &c.) should be allowed. (b) This increase, from 4 inches to 6 inches in the mile, would also allow the vertical scale for the sections to be increased from 100 feet to 80 feet, or even to 60 feet to the inch, which latter would not be much more than the increase necessary to assimilate the profiles of the ground to the proportions of the scales now in use; and would insure much greater distinctness and accuracy, and easier detection of errors. At all events, the vertical scale of the sections should be made uniform as well as that of the plans; and should certainly not be less than 80 feet to the inch.

In addition to the simple line upon the plans, it would be very easy, on such a scale as the above, to indicate the extreme breadth of land on each side to be taken for the Railway, including the fences and the slopes of the excavations and embankments, which the engineer could very readily deduce from the sections; and the necessity of so doing would further

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(a) The several lines on the same Plan.

(b) In respect to the detailed sections of the lines laid out by me, in the South and South-western districts of Ireland, the above scale has not been adopted, because the Ordnance Surveys had not then been made; and the plans and sections must necessarily be revised when the lines are prepared for execution.—I except from this remark Plan No 1,* from Dublin to Celbridge Commons, MS. copies of the plans having been furnished, by permission of Colonel Colby, to enable the entrance line into Dublin to be distinctly shown, and the line having been examined in detail and laid out with care.

Appendix A. No. 1.

Report on the South and South-western Lines of Railway.

require much greater care in determining the course of the Railway, and the location of the same on the plans and on the ground.

I conceive this mode would be much more explanatory to the landowner, and far less likely to mislead and confuse, than the combination of the section upon the face of the plan as recommended to the Committee of the House of Commons on Standing Orders, and since ordered for adoption. To the Engineer such a combination is very useful, and for my personal reference I have long since occasionally used it on the Ordnance maps of England; but to the Owners and Occupiers it will convey the impression, that their lands are to be affected in a totally different place and manner from what really would be the case.

I shall now enter on a brief description of the several Railways, tracing their respective routes through the country, and defining the general character of their gradients or inclinations.

I. MAIN TRUNK LINE.

Main Trunk Line.

It appeared exceedingly desirable that the general terminus, or rather point of departure of the Main Trunk Line of Railway for the south and south-western districts of Ireland, should be advanced as far as possible into the city of Dublin; and I therefore strongly recommended to your Commission, and you were pleased to approve, that the general terminating station should be fixed at Barrack-bridge, at the west end of the quays bounding the south shores of the river Liffey. Barrack-bridge is only 1½ mile from the General Post Office in Sackville-street, and is approached from the first contemplated station at Island-bridge Road, entirely through open and unimproved land, without disturbing a single building; and an additional mile of Railway into Dublin is thus attained at a comparatively minor cost. A further, though prospective advantage, attends the terminus at Barrack-bridge, viz., that the Railways at each extremity of the city may be hereafter connected, in the manner explained in a Report I have already laid before the Commissioners; and though such an extension through Dublin may form no part of the Report or recommendation of your Commission, it may not be altogether unworthy of consideration, that such a Railway connexion may, at some future time and favourable occasion, be made at a moderate expense, and with great facility.

In the commencement of these surveys, although the mode of entering Dublin had not been decided upon, it was necessary to forward the engraving of the plans and sections; and the road near Sallins being found to be 17 miles from the outskirts of Dublin, at Island Bridge Road, and the road from Celbridge to Newcastle, about 11 miles from the same point, the mileage was regulated forward accordingly.

After your Commission had decided which line into Dublin should be adopted, the zero of the mileage, as measured back from Sallins, was found to fall upon or near the avenue to Inchicore House, three miles from the General Post Office; and throughout this Report and the annexed Plans and Sections, this point will be considered as the commencement of the distances, while the space from Inchicore Avenue to Barrack-bridge, 1¾ mile, will be designated as the Entrance into Dublin, and treated as a separate subdivision of the Main Trunk Line.

The General Station being fixed at Barrack-bridge, the course from thence, as approved by the Commissioners, is along the valley of the Liffey, first crossing the King's-bridge Road, and the Military-road below the Royal Hospital, next going over Island-bridge Road, close above the Artillery Barracks, and thence direct to Inchicore Avenue. The estimates for this subdivision are considerable, from the value of property, and the extent of earth-work and masonry, the bed of the Railway being prepared for four lines of road.

The level of the station at Barrack-bridge is rather elevated, being 43 feet above the high water datum, and about 30 feet over the street, and the mound averaging nearly this latter height all the way to the Island-bridge Road. In execution it may be advisable, on several accounts, besides the saving of expense, to lower this elevation.

From Barrack-bridge to the Artillery Barracks, I have estimated to construct the Railway within retaining walls, filling in with earth, and forming the bridges, &c., for four lines, precisely as was done on the Dublin and Kingstown Railway, but laying at first only two tracks: this filling may be done either by common carts bringing rubbish from the city and parts adjacent, or by the excavated material being brought from the cuttings westward, by locomotive engines, when the works there are advanced.

Plan No. 1,* Section A.

After passing through the whole length of Inchicore demesne, the turnpike road is crossed, and the Railway keeps parallel thereto, at little more than 100 yards distance, to near Palmerston, when it recrosses the road and enters the enclosures of Palmerston House, and skirting the rising grounds which overhang the right bank of the Liffey, pervades several other demesnes, Hermitage being the last, and once more crosses the turnpike road to Lucan, at the entrance of the avenue leading to Woodville. After passing the ravines near Esker, a remarkably fine line is obtained, almost on the surface of the country for many miles, approaching near Leixlip, then over Celbridge Commons, and thence, nearly direct to Whitechurch and the vicinity of Sallins, with very favourable gradients.

The superiority of this, which I distinguish as the river line, over either of the other two lines which have been proposed will be obvious on even a casual view of the comparative sections. At Island-bridge road the level is nearly 30 feet lower than the Parliamentary level of the Great Leinster and Munster (Dublin and Kilkenny) Railway, which has its terminus such, that it would not be practicable to extend their line into Dublin, except at great cost. Independent of this circumstance, the quantities of earth-work would be five times greater on those lines, avoiding the demesnes; that is, calculating the deep cuttings to have the usual slopes; or if the material did not require slopes, or only very steep ones, its consequent hardness would demand a proportionably augmented price, so that after every allowance for damages to the properties, the money difference would be vastly in favour of the river line; even by adopting gradients on the Kilkenny Railway of 16 feet in the mile, and upwards.

Main Trunk Line.

Plan No. 1, Section A.

Very suitable ground between the Grand Canal and the river Liffey may be obtained for any Railway level from Celbridge Commons, westward towards Sallins. The line I have laid out will pass close to Whitechurch, and near the cross-roads between Devonshire bridge and Bodenstown, then cross the river Liffey and over the Grand Canal immediately north of the Leinster aqueduct. From the Canal the Railway keeps parallel to the Liffey for 3 or 4 miles, and proceeds to traverse the Bog of Allen, and across the Miltown branch of the Grand Canal, where the first summit is attained, 293 feet above high water in Dublin bay; the line having surmounted an ascent of 222 feet in 25 miles, of which 5 miles only are at the rate of 16 feet per mile.

From Miltown the line necessarily descends to the valley of the river Barrow, and it has been purposely directed to pass about midway between Monastereven and Portarlington. It appears to me questionable whether any probable saving of expense would make it desirable to keep to the north of Spire Hill. It would go nearer to Portarlington, but would leave Monastereven at an inconvenient distance; whereas the Railway as proposed passes only about 2 miles north of that town. The descent from Miltown to the Little Barrow river is 94 feet in 11 miles; the line is then horizontal for a mile, at an elevation of 199 feet above high water.

Plan No. 2, Section A.

From the valley of the Barrow to pass Spire Hill, a rise of 16 feet per mile occurs for a distance of 3½ miles. From Spire Hill the route is nearly south-west, passing Emo bog on the north of Lord Portarlington's demesne, and crossing the Trihogue or Blackwater river, about 1½ mile north of Maryborough, and 3½ miles south of Mountmellick. From the Trihogue river another rise, for 3½ miles, of somewhat less than 16 feet per mile, will bring the Railway to its second or Maryborough summit on Ross bog, 52½ miles from Dublin, and at an elevation of 345 feet above high water. The rise from the Barrow valley will be 146 feet in 15½ miles.

From this summit a branch may be very advantageously taken off to Kilkenny, as will be more particularly described hereafter; the total distance from Dublin to Kilkenny by this route being 79 miles.

Besides numerous transverse profiles of the country, two series of levels were taken from Naas to Maryborough, of which I consider the one selected as much the best. The high ground of the Curragh of Kildare and vicinity would present a summit to be surmounted at least 30 feet higher than at Miltown, and which must be acquired at great expense of excavation. To pass the Curragh advantageously, and to avoid Emo Park, it would be necessary to keep below Monastereven, and to cross the Barrow on a level nearly 20 feet lower than the line I have adopted, and of course increasing the rates of inclination, while the embankments over that valley would be much longer. In addition to which, the high ground at Maryborough heath, and beyond, would also be more difficult to surmount; and, even if the levels were equally favourable, I consider that it is better to throw the line to the north, in order to approach several important towns in the King's County, and to carry the Main Trunk Line more centrally through the district.

Plan No. 2, Section B.

From the Maryborough summit on Ross Bog, a gentle descent takes place to the river Nore; the fall being only 21 feet in 6 miles, making the Railway level at the Nore (about 2 miles south of Castletown, and 3 miles from Mountrath) 324 feet above the datum of high water in Dublin bay; the distance from the capital being 58½ miles.

Plan No 3, Section B.

From the river Nore the line ascends to pass the third summit, on a bog between 2 and 3 miles south of Borros-in-Ossory, attaining its maximum elevation of 409 feet at 64½ miles from Dublin. Some heavy earth-work will be requisite on this length, but the inclination will scarcely exceed 14 feet per mile.

The quick fall of the Garryduff river (an important tributary of the Nore,) compels the Railway to be carried towards the head-waters of this stream, and those of the Erkin, its principal branch, maintaining a nearly horizontal line (slightly falling, however,) for many miles. In being thus forced north of Rathdowny, (from which, nevertheless, it is little more than 3 miles distant,) the line is brought nearer to Roscrea, a town of much more importance, from which it is not further distant than 8 miles, across a country favourable for forming a new road, or constructing a branch Railway.

From the Erkin a deep cutting will be requisite, through Dromard bog; but from thence to the Washpin, a hamlet two or three miles south of Templemore, the earth-work is easy.

At two miles beyond the Washpin, and at 80 miles distant from Dublin, the descent from the last summit has been only 22 feet in 15½ miles. From hence to the Suir the fall is somewhat quicker for three miles, and at that river the Railway level is 357 feet above the datum. The direction is then parallel to the Suir, and the line will pass three-fourths of a mile west of the town of Thurles, and thence to Holycross; immediately beyond which town the Main Trunk line terminates, at a distance of 89¾ miles from Dublin, being there 307 feet above the datum level of high water in Dublin Bay.

Plan No. 4, Section C. Section F.

At the termination of the Main Trunk, two principal lines diverge; the first to the south towards Cashel, and thence by Cahir to Cork, with another line by Clonmel and Carrick to Waterford; the second to the westward, which will be next described as—

Appendix A.
No. 1.

Report on the South and South-western Lines of Railway.

Shannon Line.

II. THE SHANNON LINE.

Plan No. 4. Section C.

From the separation at Holycross the Railway will descend rather quickly for more than 2 miles, to the river Clodagh, a branch of the Suir. The level of the rails is here 274 feet above the datum. From the Clodagh, near Miltown Castle, a nearly uniform ascent for 9½ miles carries the Railway by the old castle of Ballagh, and the woods of Dundrum, to a summit at the Multeen river, 324 feet above high water. From hence the descent to Limerick commences, first falling to the level of 309 feet at the village of Donaghill, about five miles north of Tipperary. It is at this point, which is 103 miles from Dublin, and about 23 miles south-east of Limerick, that another line is taken, south-eastwardly, which passes by Golden, towards Clonmel, being a portion of the transverse line of Railway from Limerick to Waterford, as will be hereafter described.

From Donaghill to Lynfield, in the county of Limerick, at a point on the Dead river between Cappamore and Pallas-Green, a uniform inclination of 16 feet per mile can be obtained on further examination in detail. Owing to some misapprehension of my instructions by the assistant who surveyed this district, the fall has been made rather steep for half the distance, and nearly level for the remaining half.

Plan No. 5, Section C.

From Lynfield, for six or seven miles, the line falls with a very easy inclination, and over very favourable ground, for the first two or three miles, occupying nearly the site of the original line of Railway from Limerick to Waterford, laid out by the late Mr. Nimmo, about twelve or thirteen years since. Owing to a similar misconstruction of orders, and to defective maps, the profile of the ground, for the last five or six miles into Limerick, as levelled, is unnecessarily high: a second set of levels would easily find ground suited to the gradient, with a very much less extent of earth-work than shown on the detailed section.

It is manifest the inclinations and facilities mentioned might be obtained, when the detailed surveys and sections are to be prepared for Parliamentary purposes. The time being short, and more doubtful points requiring first attention, I was anxious to close the out-door work, in order to get the Plans, Sections, and Estimates in hand for this Report.

The Railway reaches Limerick at the Lunatic Asylum, in the Cork road, on a level 41 feet above high water, and at a distance of 125½ miles from Dublin.

A natural hollow, immediately south of the main portion of the city of Limerick, affords a convenient passage for the Railway, which descends gradually to Ballinacurra bridge, where it crosses the Tarbert road, and then continues nearly parallel thereto, at a greater or less distance, but avoiding its bends for the whole way down the banks of the Shannon.

Plan No. 6, Section D.

A slight rise occurs between Ballinacurra bridge and the navigable river Maig, which is crossed about midway between the town of Adare and its confluence with the Shannon. After passing horizontally across the Marshes, another ridge between Pallis-Kenry and Askeaton compels a rise of 12 feet per mile, for four miles, and a deep cutting at the summit reduces the level of the rails to 60 feet above high water, being the most elevated point between Limerick and Tarbert. A gentle fall of 8 feet per mile, conducts the line across the river below the town of Askeaton, and on to the marshes of Fannamore.

From Fannamore to Tarbert, the line, after crossing the Marshes, keeps close under Poultallan Point, opposite the New Harbour at Foyne's Island, and below the cliffs at the demesne of Mount-Trenchard; and thence along the coast, and across the small bays and inlets of the south bank of the Shannon, passing in front of Loghill and Glin, to terminate at whatever point of Tarbert Bay may be considered advisable. The last 15 miles of the line are horizontal; the total distance from Dublin to Tarbert Bay being 159 miles, and from Limerick to Tarbert about 33½ miles; the whole of which latter length may be said to be peculiarly favourable, both in inclinations and facilities for construction, and will, besides, present a coast line of considerable attractions.

Some little interference with the ports of Glin and Loghill will necessarily ensue; but, in both instances, this may be remedied by altering and improving the present landing places and shelter.

At Askeaton, to dispense with a swivel-bridge, it will be better to construct new quays below the line of Railway, providing access to them by arches, and otherwise restoring the accommodation for the trade of that town.

The passage of the river Maig will, however, involve a choice of difficulties. Should a permanent stone or iron bridge be constructed, the transit of vessels with masts to the town of Adare, five miles above, will be stopped; but, if a navigable channel must be kept open for masted craft, the Railway will be deformed by that most awkward impediment, a swivel-bridge. If quite unavoidable, this will be a great blemish on what would be, otherwise, a remarkably eligible line of Railway; besides, the chance of accidents from a swivel-bridge being left open, has been proved by experience to be far from inconsiderable.

Should the importance of the commerce of the town of Adare compel the adoption of a swivel-bridge, a proper regard for the safety and accommodation of the public requires that it should only be opened to admit the passage of vessels at times when no Railway train shall be in sight.

The Shannon Line appears to possess peculiar engineering advantages, and to afford easy access to a port in direct connexion with the Atlantic Ocean. On the advantages of Tarbert or Foyne's Island, as packet stations, it is not within my instructions to offer an opinion.

Thus far the Commissioners will perceive that I have been able, in laying out these lines, to follow, almost literally, their original instructions; and I now revert to the termination of the Main Trunk Line, at Holycross, to proceed in my account of the lines to the south-west, commencing with

III. THE CORK LINE.

The Cork Line will branch from the Main Trunk a little to the south of Holycross, and, recrossing the river Suir, continue parallel to the river as far as Cashel, passing to the westward of that town, which is ninety-eight miles from Dublin, by the proposed Railway.

Plan No. 4, Section E.

Some demesnes, on the banks of the Suir, induced me to keep to the eastward of the Cashel road, and the valley of the Thurlesbeg river being wide and flat, an apparently unnecessary undulation of the section occurs.

It is probable, a closer examination might enable the Engineer to obtain a uniform ascent from Holycross to Cashel, should such be considered necessary, but the deep cutting between Fore Abbey and the race course cannot be avoided, except by a circuitous course, and an inconvenient route, as regards Cashel. The summit, south of this town, is 332 feet above the datum, and, if the rise were perfectly uniform, would exhibit an ascent of 2½ feet per mile, for 10 miles. As laid out, except for 3 miles of 1 in 352, the levels are very good.

In descending to recross the Suir above Cahir, the line levelled gives an inclination of 1 in 314. When the Railway is actually laid out, this may be readily reduced to a slope of 1 in 330, or 16 feet per mile, which I have established as the maximum inclination; but, knowing such might be hereafter investigated in detail, I have not considered it needful to cause further levels to be made at present.

About midway between Cashel and Cahir, the Cork Line will be intersected by the line from Limerick to Clonmel and Waterford, as hereafter described; and the respective levels of the Railways are such, that a very short branch, with suitable gradients, would put the latter line in direct communication with the lines from Dublin; making Clonmel 115 miles, Carrick-on-Suir 126 miles, and Waterford 139 miles, by Railway, from the Irish metropolis.

The level of the rails, at the last crossing of the Suir, above Cahir, is 227 feet above high water in Dublin Bay, at an elevation of 75 feet above the valley, the distance over which is very short, and the point of crossing otherwise peculiarly favourable. After passing the Suir, the Railway continues for two miles parallel to the river, and approaches, at the 108th mile from Dublin, within three-fourths of a mile of the central part of the town of Cahir, and afterwards crosses the new posting road from Cahir to Mitchelstown, at the Police Barracks, and keeps parallel to, and on the south side of this road for 10 miles, having a uniform rise of 1 in 452, from the Suir to the summit, at some distance north of Ballyporeen, and near the Mitchelstown caves, at which summit the Railway level is 376 feet above the sea at high water.

Plan No. 7, Section E.

From the above point to Mitchelstown, the line descends at the rate of 1 in 334, or something less than 16 feet per mile, for 5 miles along the right bank of the Draebawn, one of the head branches of the Funcheon river, passing, half a mile beyond the summit, into the very southern extremity of the county of Limerick: it then enters the county of Cork, one mile to the north of Mitchelstown, 126 miles from Dublin. The line, as levelled and graduated, falls 1 in 245: it then rises towards Kildorery, at the rate of 1 in 634, and continues, with a very slight rise, nearly two miles further, then falls 1 in 440, to the Owbeg river, which it crosses 136 miles from Dublin, and at an elevation of 198 feet above the datum level of high water in Dublin Bay.

By keeping further towards the roots of the mountains, and with some extra expense of earth-work, the descent may, most probably, be made continuous from Mitchelstown to the Owbeg river, nowhere exceeding 1 in 330, or 16 feet per mile; but as this required a good deal of examination, which time would not permit, I did not attempt the additional surveys, being satisfied that such might be effected when the Railway was ultimately laid out.

The Owbeg river is crossed about two miles north of Castletown-Roche, and a little above Anne's-grove, with a short but high viaduct. From the Owbeg to the Blackwater river, at Mallow, the fall is gentle and continuous.

At Shanakilty, 139 miles from Dublin, the Railway is within 4 miles of Doneraile.

Repeated examinations, and many lines of levels were requisite to fix the most advisable route by Mallow. Circumstances, and the experience I had obtained in the investigation of the Railway previously contemplated between Cork and Limerick, gave me much additional assistance and information. On the whole, it appears to me most advisable, that the Cork line should be carried from Shanakilty to Anakishey, down the Spa-Glen, and through the town of Mallow, passing over the streets at a considerable elevation. The extreme height of the Railway above the stream of the Blackwater, will be 60 feet, and the embankment and viaduct must, necessarily, be an expensive work.

The level of the Railway, when over the main street of Mallow, will be 178 feet above the datum level of high water in Dublin Bay, and the distance will be 145½ miles from the metropolis.

Plan No. 8, Section F.

Up to Mallow it will be practicable, and within the limits of reasonable expense, to keep the acclivities and declivities of the Railway not exceeding 16 feet to the mile; but between Mallow and Cork, we have to abandon this limit of slope, and are unavoidably compelled to adopt inclinations of greater steepness. From the town of Mallow to the summit (where the waters of the river Clodagh flowing to the Blackwater, and those of the river Martin, falling south to the Lee, have a common source near Ballyhillogue), the rise somewhat exceeds 30 feet per mile, the graduation of the line being 1 in 173, for about 7 miles. This is inevitable, and we must be reconciled to it by referring to the absolute necessity which occasionally forces the adoption of such sections. Thus, on the Grand

Junction Railway (between Birmingham and the Liverpool and Manchester Railway), an inclination of 1 in 180 has been had recourse to, as the mode of surmounting the passage across the Madeley summit. The length of this inclination, on the Grand Junction, is 3 or 4 miles, a distance sufficiently long to test the capability of the locomotive engine to carry the usual trains up such a slope, at a satisfactory speed; a test which has been successfully applied.

Cork Line.

The summit between Mallow and Cork, on the Railway level, is about 400 feet above the datum. The descent from thence to Cork, on the line which, on the whole, appears to be the most eligible, will be at the rate of 1 in 237, or nearly 22½ feet per mile, for about 7¼ miles, to the vicinity of Blarney, at which point (236 feet above the datum, and about 160 miles from Dublin,) the south-western line to Berehaven will branch off; but from Blarney to enter Cork, as I am about to suggest, the descent will be as gentle as 1 in 868, for something under six miles, to Cork barracks, from whence an inclined plane, to be worked by stationary power, must be made, if it be required to connect the Railway with the river Lee and harbour of Cork.

Plan No. 8, Section F.

The terminating point at Cork barracks being 200 feet above high water, and the distance to the river little more than half a mile, it will be seen on inspecting the detailed section, that the plane will have to descend as much as 1 in 15; an inclination, it must be confessed, highly objectionable, and which can only be justified by an extreme emergency. This inclination might probably be softened; that is, the length of the plane could be increased by making the descent diagonally on the hill side, either pointing up stream towards St. Patrick's bridge, or down towards Glanmire. If so, the chief objection will be removed, as the entrance of a Railway into a large town by an inclined plane worked by stationary power is not unprecedented. At Glasgow, in Liverpool, and even into London, it has been thus proposed, and in the two latter instances executed, though by planes considerably easier than the above.

Several other approaches into Cork have been tried; one by a line from Blarney, to terminate at Blackpool, on a level about 100 feet above high water; but it would scarcely be practicable to extend the Railway from this latter station to the harbour without a very considerable expense, while an inclined plane and stationary power would still be requisite. This line is, moreover, inconveniently situated with respect to level at Blarney; and its adoption would induce a change in the course of the first part of the Berehaven Line, between Blarney and the river Lee at Ballincollig, rendering it much more expensive, while the gradient from Blarney to the summit would be increased to 30 feet to the mile. Should the extension from Cork barracks to the harbour not be considered by the Commissioners so advisable as to terminate the Railway at Blackpool, it may be possible to find a line from the latter place to Blarney, not exceeding the rate of 1 in 237, to unite with the line on the higher level at that point. But I think the advantage of uniting with Cork harbour overbalances the inconvenience of the inclined plane, the main objection to which is the steepness.

An Act has been obtained for a Railway from Cork to Passage, terminating at the new quay there, and opposite deep water, in a safe and sheltered arm of the Cove of Cork. The distance between a terminus of the line from Dublin, at St. Patrick's Bridge, and the commencement of the Passage Railway is very short, yet the connexion by Railway could not be conveniently or economically made; but as Cork would be always a stopping place for passengers on their way to the port of embarkation, this extension through Cork is not to be considered absolutely indispensable. But were it so, I should remark, that a Railway has been suggested between Cork and the town of Cove, and that a connexion could be made by the inclined plane, from Cork barracks to some point on the Cove Line, thereby forming a continuous Railway communication from Dublin to Cove, should that point be deemed the most eligible for a packet station.

The distance from Dublin to Cork, either to the river below the barracks, or to Blackpool, would be nearly the same, viz., 166½ miles; and by the Cork and Passage Railway, to the new quay at Passage, about 6½ miles; and by the Cork and Cove Railway, to Cove, about 10½ miles; making Passage 173 miles, and Cove 177 miles from Dublin.

Other modes of approaching Cork are to be found by diverging, or rather by reversing, in a south-eastward direction, from the Berehaven Line, either at the banks of the Lee, or of the Bride, and terminating in front of the new gaol, and, if necessary, to be thence extended to pass quite through the city; otherwise, to keep round entirely to the south of Cork, and to form a junction with the Cork and Passage Railway on the Slob, below the Monerea Marsh. By each of these lines on the lower levels, a continuous Railway line to a packet station at Passage would be obtained; but either of them would add 10 miles to the distance between Dublin and Cork, and, although much cheaper lines, and with superior gradients to those on the higher levels from Blarney, their additional length, as branches into Cork, would scarcely allow of any diminution in the total cost of construction. It is only in the event of the packet station being fixed at Berehaven, and a very direct line being required from thence to Cork, that these lines on the lower level need be considered; and even then the gain in distance would scarcely justify the additional length of Railway to be made.

Plan No. 8, Diagram Sections.

The whole of the approaches into Cork are full of difficulties, and it has required a great deal of time and attention to examine and determine the most eligible route. The details of the lines here recommended may probably be much improved when finally set out; but I have considered it sufficient to fix the entrance into Cork to be on the high level to the barracks, with or without a communication to the harbour, and that Blarney should be the point of departure for the south-western line to Bantry Bay, which line I proceed to describe.

Report on the South and South-western Lines of Railway.

Berehaven Line.

IV. BEREHAVEN LINE.

Commencing on the high level, at 160 miles from Dublin, and at a point 236 feet above the high water datum, the Railway will cross the Martin river above Blarney, and follow the right bank of that stream to its junction with the Shawnagh river; and where this river, which hitherto had flowed south-west, makes a very sharp bend, and flows south-east to fall into the river Lee, the Railway sweeps round in a south-westwardly course, and forcing its way, by a half-mile tunnel, through a ridge of hills, then crosses the river and valley of the Lee near Ballincollig, $165\frac{1}{2}$ miles from Dublin, at an elevation of 70 feet in height; and, returning to a south-west course, attains the banks of the river Bride, one of the principal tributaries of the Lee. The descent from Blarney to the Lee is 1 in 237, being a continuation of the original gradient from the summit between Mallow and Cork. The Railway level at the viaduct over the valley of the River Lee, is 114 feet above high water. From thence to the river Bride the rise is only 1 in 660, and the elevation of the Railway there would be 134 feet above high water, at 168 miles from Dublin.

Plan No. 8,
Section G.

The valley of the Bride is now followed with a very gentle ascent for 7 or 8 miles, when the result of my various inspections and levels induced me to quit that stream, and to gain the valley of the river Lee, 2 or 3 miles below Macroom.

In seeking materials for this part of the inquiry, and for determining the summit between the head-waters of the streams flowing westward to Bantry Bay, and eastward to Cork, I had access to some useful documents furnished me by the Commissioners, and prepared by Messrs. Leahy and Son, Civil Engineers.

I should mention here, that we struggled a long time to find a more direct line from the summit between Mallow and Cork, through some of the lateral valleys, proceeding west from the Clydagh valley, by Plucanes, Donaghmore, and Carrigadrohad, to Macroom or its vicinity. Several weeks were spent, in the severest part of the winter, on this route, and in exploring, with occasional levels, other lines more direct. The difficulties, however, both of inclination and construction, were much too formidable, and it was found that the most eligible route was to approach within 6 or 7 miles of Cork; and, on the whole, I am satisfied that the little addition to the length of the Railway is more than compensated by the small extent of the branch line into Cork, which is at least 10 miles shorter than it would have been if obtained in any other manner.

Plan No. 8.

From below Macroom, the Railway keeps the south-east side of the extensive flats or swamps of the river Lee about Toom, and then passes by Drumcarrow Castle, and follows the Lee, close to the village of Inchygeelagh; and from thence, after skirting the north shores of the lakes, crosses at their upper end, arriving (194 miles from Dublin) at the road leading from Macroom to the celebrated Pass of Cummineer.

The Railway level is here 289 feet above high water, and the rise, in the last $28\frac{1}{2}$ miles, from the river Lee near Ballincollig, only 175 feet, or averaging about 1 in 860, and over a district presenting a most peculiarly favourable section as to earth-work, &c.

Here the facilities for Railway formation are much diminished, and difficulties of gradient and physical obstacles interpose for nearly 20 miles, of a character which, if not unprecedented, is at least formidable, and in one or two of the points gigantic. It will rest with the Commissioners and the Government to determine how far the object attainable by surmounting them, is worthy of the cost which must accrue.

Plan No. 9,
Section H.

Rising from the 194th mile, the Railway proceeds, still closely following the river Lee for more than three miles, when the stream is left, and the Pass of Cummineer entered. Here the line is about a mile below the gloomy lake of Gougan-barry, the source of the Lee. A tunnel of 2000 yards ($1\frac{1}{3}$ mile) is now required, to penetrate the ridge and attain the extreme summit, on the south side of the Pass, at an elevation of 469 feet above high water, and nearly 199 miles from Dublin. The ascent from the lake to the summit is at the rate of 40 feet per mile, or 1 in 132, for $4\frac{3}{4}$ miles.

The descent to the head of Bantry Bay, and thence to Glengariff, is spread over about 13 miles; the total fall is upwards of 400 feet, averaging about 1 in 170; and on this inclination, as well as on the preceding ascent of 1 in 132, there is no doubt that all such trains of goods or passengers as may be likely to pass this line, will travel upwards with facility, and downwards with safety.

Similar to the above are the prevailing inclinations upon the Railway I have designed, and am now commencing to construct, between Sheffield and Manchester, extending for 40 miles, and surmounting, about midway between those great commercial towns, an elevation of nearly 800 feet above the termini at each end. The importance of the communication has induced the promoters of the measure to submit to gradients of 40 feet in the mile, although these were only to be obtained by the construction of works of great magnitude, necessarily requisite, from the roughness of the country which the Railway unavoidably traverses.

On the Berehaven Line, as laid out, the summit tunnel, penetrating the dividing ridge of mountains, is one of an ordinary length; but the passage of the vale of Coomhoola, and the bay of Glengarriff, are doubtless engineering difficulties of more than an ordinary nature.

The valley of Coomhoola will be passed by means of a lofty viaduct, the materials for which lie on the hill sides adjacent, with limestone in the vicinity. The extreme height of this construction will be about 200 feet; the average height is little more than 90 feet; the length about 600 or 700 yards.

From Coomhoola, the Railway must skirt the head of Bantry Bay; and approaching

Appendix A. No. 1.

Report on the South and South-western Lines of Railway.

Berehaven Line.

Glengarriff, south of Captain White's grounds, I propose to take advantage of a chain of islands which divide the inner and outer bays, and to cross, curving with a radius of about 1000 yards, upon an embankment and occasional arching, at an elevation of 62 feet above high water. The channel, from the outer to the inner anchorage, is very narrow, though deep; it lies between the easternmost island and Captain White's grounds. Glengarriff bay is 212 miles from Dublin.

If Berehaven is to be attained, I consider the crossing of Glengarriff bay a necessary step towards it; and whatever may be judged of the proposition, I am of opinion that this mode is much more advisable than going round the head of the Bay, even if that were practicable.

Plan No. 10, and Section thereon.

A passage could be left in the channel, of width sufficient to admit all such craft as, at long and rare intervals, seek anchorage in the inner Bay; in which case it might be necessary to have recourse to the aid of the diving bell. All the other work requires mere ordinary masonry.

Glengarriff Bay once passed, the distance to Berehaven is 19 miles, and a line may be traced along the north shores of Bantry Bay, cutting through the projecting points, and striding across a few small inlets. A short tunnel of 800 yards, near Roosk, and the crossing of Adrigoole bay, are the chief points of difficulty in this distance. The profile of the Railway, from Glengarriff to Berehaven, may be called practically level; as laid out it no where exceeds 1 in 566, and that for a short distance only. The most advisable termination appears to me to be upon Dinish Island, 231¼ miles from Dublin, opposite to Castletown; the Railway level being there about 22 feet above high water.

Plan No. 9, Section H.

VALENTIA LINE.

Valentia Line.

As connected with the inquiry into Railway communications to a packet station, it may be here the proper place to make such observations as are in my power, upon the line to Valentia.

I should premise, that I have not had any opportunity of taking any actual levels through the district I am about to describe; but from having, as far as Killarney, twice personally examined the country, and also from the levels marked upon the maps of the bogs and roads in the county of Kerry, constructed by the late Mr. Nimmo, and from authentic information, I am satisfied of the perfect feasibility of such a line.

The course would be the same as the Cork line, as far as Mitchelstown; then, on account of the demesnes in the valley of the Owbeg river, to keep quite to the north of Kildorery, passing north of Doneraile and south of Buttevant, and on to Kanturk.

I may here note, that if a more direct route to Valentia were required, a practicable line, with good levels, and probably easy of execution, may be found, proceeding out of the Shannon line (before described) at Donaghill, north of Tipperary, to pass north of Kilmallock, and by Charleville to Kanturk; making a connexion with Cork through Ballyclog, crossing the Blackwater west of Mallow, and falling into the line previously described. But such a line, though nearer to Valentia, would, I apprehend, throw out of Railway communication, unless by additional lines, the important districts of Cahir and Mitchelstown, including Fermoy, and even Youghal and Dungarvan; and, therefore, as a Trunk Line, would not be so eligible.

From Kanturk, the right or north side of the valley of the Blackwater river is to be followed, as far as the boundary of the county of Kerry; then keeping a general westwardly course, north of the main road from Millstreet to Killarney, and proceeding to the north-west extremity of the lower lake; then to wind round the side of Killorglan bog, and pass north of Lough-Carraght, keeping along the cliffs, and crossing the Glanleigh river. It would be thence a coast line, along the south shores of Dingle Bay, until a favourable pass were found for leaving them, and penetrating, by a tunnel, to the head of the valley through which the Vartin or Valentia river flows, to Cahirciveen; thence following that valley to a proper terminus, opposite the island of Valentia.

Index Map.

Kildorery is about 133 miles from Dublin, and from Kildorery to Valentia is about 87 miles; in all about 220 miles. The inclinations from Kildorery, by the route described, to the summit of the Blackwater valley, on the extensive moors between Millstreet and Killarney, would be very favourable; I might add, particularly so; and if it were found advisable to diminish the expense by undulating the sections, even then, I apprehend, the ratio need in no case exceed 1 in 330, or 16 feet per mile. But after passing the summit of the table land, the distance from thence to the lower lake of Killarney (the level of which is only about 50 feet above high water), is not sufficient to avoid having recourse to inclinations of a steeper character; and probably slopes of 1 in 150 may be requisite for several miles in succession. But in this case, the disadvantageous gradients will be all concentrated in one division; and if high velocities are absolutely to be maintained, it may be accomplished by the aid of assistant locomotive engines, otherwise a retardation of speed or diminution of load must occur, but upon the ascent only.

From the Lakes of Killarney to the point where the line will quit the cliffs of Dingle Bay, and probably down to the termination opposite to Valentia Island, the inclinations will be very favourable; horizontal, or nearly so, for a considerable distance, and never exceeding 16 feet per mile, unless while traversing the ridge of hills dividing the coast from the head of the valley of the Valentia river. On the whole, it may be safely pronounced that the engineering difficulties of the Valentia line are few, and the gradients throughout very favourable.

On the other hand, a route to Valentia must probably diverge from the Cork Line upwards of 20 miles nearer to Dublin than the Berehaven Line, and thus the economy of construction and the excellence of gradients would not be obtained with very much ultimate diminution of expense; that is, of the expense of constructing a Railway communication to a packet harbour, branching from a line which must, at all events, be carried to Cork.

On account of the great elevation of the Railway at Mallow, the extension from that town, direct up the valley of the Blackwater, would be attended with considerable difficulties in crossing the lateral valleys, and by interfering with valuable property.

Valentia Line.

Another practicable route to Valentia might probably be found, by extending the Shannon Line from Tarbert, south-west to Listowell, Ardfert, and Tralee, and supposing a direct course forward from the latter town to be impracticable, the Railway must bend back, and pass between Castlemain and Castle Island, and reverting once more to the south-west, pass by Milltown and Killorglan, falling into the line before described, at the head of Dingle Bay. But the extension from Tarbert to Valentia could scarcely be less than 80, and might even extend to 90 miles; and though probably passing, with a few exceptions, over a favourable range of country, and presenting good levels, the augmented distance may reasonably be supposed to bring the cost of construction to as much as, or even more than by either of the other routes. It would, however, have certain advantages, in opening the improving parts of the county of Kerry, and giving them a direct and speedy communication with Dublin; and more local traffic might be looked for; while the favourable levels, and a fertile soil, would induce a greater amount of agricultural traffic.

Index Map.

V. LIMERICK AND WATERFORD LINE.

Limerick and Waterford Line.

The connexion of the important cities of Limerick and Waterford by Railway, has so long been a favourite object with many influential persons, both in Ireland and England, that it has not failed to attract the attention of the Commissioners. In pursuance of their instructions, I adopt the Shannon Line as part of this course, from Limerick south-eastward to Donaghill, a few miles north of Tipperary.

Quitting the Shannon Line at Donaghill, (23 miles from Limerick,) I have laid out a route, proceeding south-eastward by Donaskeagh, and the demesne of Thomastown, to cross the River Suir, about a mile below Golden-bridge.

In the section hereto attached, one-half this distance is horizontal, and the remainder falls at the rate of 18 feet per mile, or 1 in 293. In laying out the line for execution, I apprehend it will be easy to reduce this inclination to the standard of 1 in 330. I did not conceive it necessary to do more in the first instance, than to run one set of levels in this district.

Plan No 4, Section I.

From the River Suir the Railway proceeds to rise gently, and crosses the Cork Line, about midway between Cashel and Cahir, at 104½ miles from Dublin, and 36 miles from Limerick. It then proceeds to a summit on the road from Cahir to Clonmel, being there 307 feet above the high water of Dublin Bay, 41 miles from Limerick, and near Woodruffe demesne, from whence it has been conducted to fall into the course of the originally projected Railway from Waterford to Limerick, as laid out by the late Alexander Nimmo, the celebrated Engineer; the direction and inclination of which line is followed, falling from the summit near Woodruffe, at the rate of 1 in 151, to near Clonmel. Beyond that city no line has been explored by me, but either the route from Clonmel to Waterford, designed by Mr. Nimmo, or that afterwards proposed by Mr. George Stephenson, might be taken; or a line to pass Clonmel on a higher level could be found, and with gradients probably not exceeding 16 feet per mile. The whole distance from Limerick to Waterford, by either route, would be about 73 miles; viz., 23 miles along the Shannon Line to Donaghill, near Tipperary; 20 miles from Donaghill to the junction with the original Limerick and Waterford Line; 4 miles further to Clonmel; and 26 miles from Clonmel to Waterford.

Plan No. 11.

As Clonmel must have a communication with Dublin, a connexion will, of course, be made with the Cork Line, where the Railway from Limerick crosses, which may be done by a few hundred yards of branch, and the levels of the two lines, going in opposite directions, render this easy. Clonmel would thus, by Railway, be 115 miles from Dublin, and it would only require the 20 miles from Donaghill to the Cork Line, and the 26 miles from Clonmel to Waterford, to complete the Railway communication between the latter city and Limerick, being little more than one-half the whole distance between these places, the remainder being necessarily constructed to connect Limerick and Clonmel with Dublin. A communication would also be thus established between Cork and Waterford, which would be but a very few miles out of a direct course, while a general opening would be made, from all the above important commercial towns, into the very heart of the country.

VI. KILKENNY LINE.

Kilkenny Line.

The last line I have now to point out, is the one to the city of Kilkenny. This leaves the Main Trunk Line at the summit, on Ross Bog, 2 or 3 miles south-west of Maryborough, and 52½ miles from Dublin, that point being 345 feet above the datum high water level in Dublin Bay.

Plan No. 12, Section K.

The general course of the line is nearly south, passing Mr. Lawler's demesne, and close to Corbally, leaving Ballyroan two miles to the east, then passes close adjoining the town of Abbeyleix, and over Abbeyleix bog, to the Cross-roads at Branra Gate, about midway between Durrow and Ballynakill; thence by Grennan Church to Ballyragget, and along the left or east bank of the River Nore, arriving in Kilkenny at the barracks, 79 miles from Dublin, and 169 feet above the datum, having fallen 176 feet in the 26½ miles from the summit on the Main Trunk Line.

The route is through a country presenting very few obstacles to the formation of a Railway, and the course of the line laid out approaches within a very few miles of the Castlecomer and Killenaule collieries.

Appendix A. No. 1.

Report on the South and South-western Lines of Railway.

TABLES OF INCLINATIONS, OR GRADIENTS of the several Railways previously described, with

I. MAIN TRUNK LINE.—DUBLIN to HOLYCROSS.

Main Trunk Line. Gradients.

REMARKS.	Reference to		Distance from Dublin.		STATIONS.	Intermediate Distances.		Inclinations or Gradients.		Difference of Level.	Rise or Fall.	Height above Datum.
	Sections.	Plans.	Miles.	Chns.		Miles.	Chns.	Per Mile.	Ratio.	Feet.		Feet.
ENTRANCE into DUBLIN	Section A.	Plan No. 1.*	0	10	Barrack-bridge -	0	0	–	–	–	–	43
			1	60	Inchicore Avenue	1	60	16	1 in 330	28	R.	71
Zero of Mileage -	Section A.	Plan No. 1.*	0	00	Inchicore Avenue	–	–	–	–	–	–	71
			5	00	Esker - -	5	00	16	1 in 330	80	R.	151
LEIXLIP - - -			6	40	Doddsborough Quarries	1	40	....	Horizontal....		....	151
CELBRIDGE - -			9	00	Loughlinstown -	2	40	13⅕	1 in 400	33	R.	184
NAAS -	Section A.	Plan No. 1.	11	40	Reeve's Castle -	2	40	....	Horizontal....		–	184
			18	40	Grand Canal -	7	00	11	1 in 480	77	R.	261
		Plan No. 2.	21	00		2	40	....	Horizontal....		....	261
First Summit -			25	00	Milltown -	4	00	8	1 in 660	32	R.	293
RATHANGAN -			33	00	Grand Canal -	8	00	7½	1 - 704	60	F.	233
			36	00		3	00	11⅓	1 - 466	34	F.	199
			37	00	Little Barrow River	1	00	....	Horizontal....		....	199
			40	40	Spare Hill -	3	40	16	1 in 330	56	R.	255
			45	00	Emo Bog -	4	40	$2\frac{5}{12}$	1 - 2164	11	R.	266
MARYBOROUGH			49	00	Trihogue, or Blackwater River -	4	00	6	1 - 880	24	R.	290
Second Summit, Kilkenny Junction			52	40	Ross Bog -	3	40	15⅔	1 - 336	55	R.	345
CASTLETOWN	Section B.		58	40	River Nore -	6	00	3½	1 - 1508	21	F.	324
Third Summit -		Plan No. 3.	64	40	Near Borros-in-Ossory	6	00	$14\frac{1}{12}$	1 - 373	85	R.	409
			68	60	Ballymullen -	4	20	⅔	1 - 7458	3	F.	406
			60	00	The Washpin -	11	20	1⅔	1 - 3124	19	F.	387
			83	00	River Suir -	3	00	10	1 - 528	30	F.	357
HOLYCROSS -			89	60	Holycross -	6	60	$7\frac{5}{12}$	1 - 712	50	F.	307

III. CORK LINE.—HOLYCROSS TO CORK.

Cork Line.

REMARKS.	Reference to		Distances from Dublin.		STATIONS.	Intermediate Distances.		Inclinations or Gradients.		Difference of Level.	Rise or Fall.	Height above Datum.
	Sections.	Plans.	Miles.	Chns.		Miles.	Chns.	Per Mile.	Ratio.	Feet.		Feet.
HOLYCROSS -	Section E.		89	60	End of Main Trunk line	–	–	–	–	–	–	307
		Plan No. 4.	94	00	Ballytarsna -	4	20	$2\frac{7}{12}$	1 in 2041	11	R.	318
			96	60	Thurlesbeg River -	2	60	11¼	1 - 469	31	F.	287
CASHEL - -			99	60	Shanbally -	3	00	15	1 - 352	45	R.	332
Summit - -			100	60	Dogstown -	1	00	....	Horizontal....		....	332
May be made 1 in 330 CAHIR -			107	00	River Suir -	6	20	16⅘	1 in 314	95	F.	227
BALLYPOREEN Summit -		Plan No. 7.	119	70	Near the Caves -	12	70	11⅔	1 - 452	149	R.	376
			124	70		5	00	15⅘	1 - 334	79	F.	297
MITCHELSTOWN May be made 1 in 330			130	20	Marshalstown -	5	30	21½	1 - 245	116	F.	181
			133	30	Kildorery -	3	10	8⅓	1 - 634	26	R.	207
			135	10		1	60	3½	1 - 1212	6	R.	213
			136	20	Owbeg River -	1	20	12	1 - 440	15	F.	198
			139	20	Shanakilty -	3	00	2	1 - 2640	6	F.	192
			142	50	Ballyclough -	3	20	$3\frac{1}{12}$	1 - 1714	10	R.	202
MALLOW - -			145	33	River Blackwater -	2	63	$8\frac{7}{12}$	1 - 614	24	F.	178
Summit - -	Section F.	Plan No. 8.	152	56	Ballyhillogue -	7	23	$30\frac{5}{12}$	1 - 173	222	R.	400
			160	19	Blarney -	7	43	22⅓	1 - 237	164	F.	236
CORK -			166	7	Cork Barracks -	5	68	6⅙	1 - 868	36	F.	200
See Diagram Sections			166	46	Glanmire Road -	0	39	Inclined Plane.	1 - 15	170	F.	30
			166	50	Cork Harbour -	0	4	....	Horizontal....		....	30

V. LIMERICK AND WATERFORD LINE.—DONAGHILL, NEAR TIPPERARY, TO CLONMEL.

Limerick and Waterford Line.

REMARKS.	Reference to		Distances from Limerick.		STATIONS.	Intermediate Distances.		Inclinations or Gradients.		Difference of Level	Rise or Fall.	Height above Datum.
	Sections.	Plans.	Miles.	Chns.		Miles.	Chns.	Per Mile Feet.	Ratio.	Feet.		Feet.
DONAGHILL, about 5 miles north of Tipperary -	Section 1.	Plan No. 4, and No. 11.	23	00	Donaghill - -	–		–	–	–	–	309
Summit - -			26	40	Donaskeagh -	3	40	....	Horizontal....		....	309
May be had 1 in 330			30	40	Near Goldenbridge	4	00	18	1 in 293	72	F.	237
			33	40	Hemmingstown -	3	00	6	1 - 880	18	F.	219
			35	40	Near New Inn -	2	00	12	1 - 440	24	R.	243
			39	00		3	40	10	1 - 528	35	R.	278
Summit - -			41	16	Woodruffe - -	2	16	13⅕	1 - 400	29	R.	307
CLONMEL -			47	00	Near Clonmel -	5	64	35	1 - 151	203	F.	104

This last inclination is that of the original Limerick and Waterford Railway, which line is followed to Clonmel; and either the route first proposed by the late Mr. Nimmo, or the one afterwards suggested by Mr. George Stephenson, may be adopted between Clonmel and Waterford.

intermediate and general Distances, Stations, Height above Datum, References to Plans and Sections, &c.

Appendix A. No. 1.

Report on the South and South-western Lines of Railway.

Shannon Line. Gradients.

II. SHANNON LINE.—HOLYCROSS to TARBERT.

REMARKS.	Reference to		Distances from Dublin.		STATIONS.	Intermediate Distances.		Inclinations or Gradients.		Difference of Level.	Rise or Fall.	Height above Datum.
	Sections.	Plans.	Miles.	Chns.		Miles.	Chns.	Per Mile.	Ratio.	Feet.		Feet.
HOLYCROSS	Section C.		89	60	End of Main Trunk Line	–		–	–	–	–	307
		Plan No. 4.	92	00	Milltown Castle	2	20	$14\frac{2}{3}$	1 in 360	33	F.	274
			96	40	Ballagh	4	40	$6\frac{2}{3}$	1 - 792	30	R.	304
Summit			101	40	Multeen River	5	00	4	1 - 1320	20	R.	324
Junction of Line from Waterford and Clonmel			102	60	Donaghill, near Tipperary	1	20	12	1 - 440	15	F.	309
See Diagram Section		Plan No. 5.	107	60	Dead River	5	00	16	1 - 330	167	F.	142
			113	40	Lynfield	5	60					
			120	00	Carriga Parson	6	40	2	1 - 2640	13	F.	129
LIMERICK			125	40	Lunatic Asylum	5	40	16	1 - 330	88	F.	41
	Section D.	Plan No. 6.	127	00	Ballinacurra Bridge	1	40	16	1 - 330	24	F.	17
			128	00		1	00	....	Horizontal	....	-	17
Summit			129	00	Corrigar	1	00	7	1 in 754	7	R.	24
			131	00	Kilkeedy	2	00	6	1 - 880	12	F.	12
			134	40	Pallas-Kenry	3	40	....	Horizontal	....	-	12
Summit			138	40	Ballyrogue	4	00	12	1 in 440	48	R.	60
			144	60	Tranmore	6	20	8	1 - 660	50	F.	10
TARBERT			159	00	Tarbert Bay	14	20	....	Horizontal	....	-	10

Berehaven Line.

IV. BEREHAVEN LINE.—BLARNEY TO BEREHAVEN.

REMARKS.	Reference to		Distances from Dublin.		STATIONS.	Intermediate Distances.		Inclinations or Gradients.		Difference of Level.	Rise or Fall.	Height above Datum.
	Sections.	Plans.	Miles	Chns.		Miles.	Chns.	Per Mile.	Ratio.	Feet.		Feet.
BLARNEY Tunnel, $\frac{1}{8}$ mile	Section G.	Plan No. 8.	160	20	On high level into Cork	–		–	–	–	–	236
Near BALLINCOLLIG			165	40	River Lee	5	20	$22\frac{1}{3}$	1 in 237	122	F.	114
			168	00	River Bride	2	40	8	1 - 660	20	R.	134
			173	00	Near Castle-More	5	00	6	1 - 880	30	R.	164
MACROOM			178	00	Near Macroom	5	00	12	1 - 440	60	R	224
			182	00	Near Toom	4	00	....	Horizontal	....	....	224
			184	00	Dromcarrow	2	00	8	1 in 660	16	R.	240
	Section H.		186	40		2	40	8	1 - 660	20	R.	260
INCHYGEELAGH,			188	00	Inchygeelagh Village	1	40	$12\frac{2}{3}$	1 - 418	19	R.	279
LAKES of ditto			190	00	Inchygeelagh Lake	2	00	2	1 - 2640	4	R.	283
			194	6	Ditto ditto	4	6	$1\frac{1}{2}$	1 - 3520	6	R.	289
TUNNEL, $1\frac{1}{2}$ mile, Summit		Plan No. 9.	198	54	Pass of Cummineer	4	48	40	1 - 132	180	R.	469
			202	24	Near Tranamadrea	3	50	24	1 - 220	87	F.	382
			206	47	Coomhoola	4	23	$36\frac{11}{12}$	1 - 143	157	F.	225
GLENGARRIFF, See Plan, No. 10,			211	55	Glengarriff	5	8	32	1 - 165	163	F.	62
Tunnel, $\frac{1}{2}$ mile			219	13	Roosk	7	38	....	Horizontal	....	....	62
			222	76	Adrigoole Bay	3	63	$9\frac{1}{3}$	1 in 566	35	F.	27
Summit			227	56		4	60	$6\frac{1}{6}$	1 - 857	29	R.	56
BEREHAVEN			231	20	Dinish Island	3	46	$9\frac{4}{12}$	1 - 566	34	F.	22

Kilkenny Line.

VI. KILKENNY LINE.—MARYBOROUGH SUMMIT to KILKENNY.

REMARKS.	Reference to		Distances from Dublin.		STATIONS.	Intermediate Distances.		Inclinations or Gradients.		Difference of Level.	Rise or Fall.	Height above Datum.
	Sections.	Plans.	Miles.	Chns.		Miles.	Chns.	Per Mile.	Ratio.	Feet.		Feet.
MARYBOROUGH Summit	Section K.	Plan No. 12.	52	35	Ross Bog, on the Main Trunk Line	–		–	–	–	–	345
ABBEYLEIX			60	12	Abbeyleix	7	57	$5\frac{1}{6}$	1 in 1023	40	F.	305
			62	44	Clonking	2	32	....	Horizontal	....	-	305
BALLYRAGGET			68	15	Ballyragget	5	51	$12\frac{3}{5}$	1 in 419	71	F.	234
			74	48	Dinan River	6	33	$8\frac{1}{6}$	1 - 647	52	F.	182
			76	33	Dunmore	1	65	....	Horizontal	....	-	182
KILKENNY			79	0	Barracks	2	47	5	1 in 1056	13	F.	169

Appendix A.
No. 1.

Report on the South and South-western Lines of Railway.

Estimates.

OBSERVATIONS ON THE ESTIMATES.

Double Lines throughout.

In compliance with the directions of the Commissioners, I have had estimates made of the cost of the various lines. The detailed calculations for these have necessarily been extremely extensive and elaborate, in order to obtain, even approximately, correct quantities and results. These details will be hereafter sent in as Supplementary Appendices, but the abstracts of the estimates of the several divisions, are given in the following tables.

The breadth of the Railway has been taken at 30 feet on the level of the rails; the land, masonry, earth-work, &c., are all computed for double lines, as are also the upper works of the Railway, consisting of the iron, sleepers, drains, materials for bed of road, &c. But between Dublin and Celbridge Commons, the land has been calculated for four lines; and the estimates for the entrance into Dublin include, in addition to the land, all the other preparations for four lines; but providing the upper works for two lines only.

The fencing will of course be the same, whether the Railway have single or double tracks.

Mode of pricing the Excavations.

In pricing the excavations I have given ample slopes, but have not made any extra allowance for rock. As a general principle, it has been considered by Engineers, that in deep cuttings (and it is there almost exclusively that rock is found,) the slopes with earth prices give nearly the same money amount, as vertical sides with rock prices. In an excavation, for instance, of 45 feet in depth, with slopes of two to one, and a base of 30 feet, the sectional area of the opening, and, of course, the cubic contents of any given length, is four times the area or contents of the cut of the same breadth, with perpendicular sides; and a price on a rock cutting, thus taken out, may be put four times as much as on the earth cutting with slopes, without any increase of estimate. In shallow cuttings this does not hold good, but the excess in these cases may be safely thrown on the contingencies, the amount not being great, and the occurrence unfrequent. In a 30 feet cutting, the difference is only 3 times; perhaps sufficient when the rock cuttings are not very hard, and with the saving of land to balance the price. But in a 60 feet cutting, the quantity with slopes of only 2 to 1, is five times the quantity with vertical slopes, and with the saving of the land occupied by the slopes, would make the rock cutting much the cheapest, unless of extraordinary hardness; longer time, however, would be required to excavate the rock, if it could not be entered on in many places at once, and carried to spoil.

Comparison of Rock and Earthwork.

Rough Masonry preferable for Embankments, when above 40 or 50 feet.

On the other hand, as respects embankments, it will, in most parts of the districts pervaded by the proposed Railways, be much better to substitute bridges or viaducts when the height exceeds 40 or 50 feet, unless the material for the embankments can be got from excavations or side cuttings very close at hand. Much time would be saved by constructions of masonry, and, in the ruder districts, by dry retaining walls, formed from the debris of rock which are found abundantly scattered in many parts of the west.

Best mode of arranging the Earth-work for Railways in Ireland.

It would be swelling these observations into a lecture upon engineering to continue them, but I cannot refrain from observing, that in Ireland, where manual labourers are abundant, and mechanical labour and application of even the simplest machinery dear, and sometimes impracticable, the Engineer in the actual graduation of the profiles of Railways, when they come to be permanently laid down, must consider carefully the circumstances of the country. A lead, (as it is technically called,) or distance for material to be carried, of only a mile, would require a large supply of rails, and a great number of waggons, increasing according to the cubic contents of the embankment. It will be difficult to find contractors who could provide themselves with a sufficient stock, or, if found, they must be paid high for their capital and skill. In most parts of Ireland then, it will be for the engineer to consider whether, from the low price of land and labour, and the almost universal use of the peasantry to the handling of stone and rock for constructions, however coarse, it will not be cheaper and more desirable, in many cases, and more especially in the remoter districts, to throw the excavations into spoil, and to fill up the vallies from side cuttings, or to construct strong substantial bridges or viaducts, or even solid dry stone mounds of a cyclopæan character of masonry.

Works at Coomhoola and Glengarriff.

At Coomhoola, for instance, although the section appears so formidable, strong everduring erections may be made with extreme economy, and afford abundant employment, under proper direction, for the most unpractised class of labourers. So also at Glengarriff, and at all parts from thence to Berehaven, over the level of the tide-water of the channels, where the diving-bell may not be required.

Average price of Excavation.

But, as it has not been possible to consider in detail, or to apply these principles at present for want of time, the computation of the Estimates for the earth-work have been made on the usual scale of slopes and cost; and it is safest to do so, as the future saving, by adopting any of these means, or by improvements in the details of the sections, may be balanced by numerous unforeseen contingencies. The average price of the whole of the excavations, is about 9¾*d.* per cubic yard, brought out from a great variety of prices, according to the particular circumstances of each section.

Road Bridges.

In estimating the masonry, every public road, except those little frequented, has had a bridge provided, and every private road, in cuttings or embankments of sufficient depth or height, and I have put in addition, one farm, or occupation bridge per mile, which I think fully sufficient. Of course, every stream and river has had provision made for crossing it. The cubic contents of masonry in each bridge and culvert have been ascertained, and for all constructions of moderate dimensions and height a uniform estimate of 5*d.* per cubic foot, or about 11*s.* per cubic yard, has been applied; except for retaining walls, which are put at 7*s.* 6*d.* per cubic yard. This is quite a sufficient price, with approaches of reasonable slopes. The severest simplicity of construction must be adhered to, and it is assumed, that those who have to make the Railway will be spared the oppressive and expensive clauses as to communications which the land-owners, canal companies, road trustees, and others, have forced into most of the modern Railway Acts for Great Britain.

Appendix A. No. I.

Report on the South and South-western Lines of Railway.

Estimates.

Coomhoola Viaduct.

Proper allowance has been made for the river-bridges, and an increased price put on the constructions of extraordinary height; the Coomhoola viaduct, averaging nearly 100 feet high, has been priced at 1s. per cubic foot, but I think it probable it might be substantially built for much less money, from the peculiar facilities for obtaining materials. The Glengarriff viaduct, 60 feet high, is priced at £1 per cubic yard. The tunnelling (all in the county of Cork, and chiefly in the remote western parts, and probably through rock,) is taken at £30 per yard forward.

Fencing.

The fencing, generally, is taken at 2s. per lineal yard of single fence, or 4s. for both sides. For a few miles out of Dublin, this has been augmented to 5s., and to 10s. for the entrance into Dublin.

Land required.

The quantities of land required have been separately calculated from the section, allowing for slopes and fences for each division; and I have availed myself of the ample experience of several highly respectable land agents, to obtain an approximate average estimate of the cost of land in the several districts. I do not think it necessary to make any particular observations on this item, except to remark, that on the two first divisions out of Dublin, from Barrack-bridge to Celbridge Commons, the quantity of land is calculated for ample slopes, and for four lines of rails; and I have taken particular pains to ascertain, from the best sources, the value of the property required, and the probable amount to be paid for damages, severances, buildings, and residence property; so that the gross amount of the estimates of the land item may be taken as covering all compensations.

Upper Works.

I now enter on the subject of the Upper Works of Railways, and considerable difference of opinion existing among Engineers as to the proper mode of construction, I shall simply state my reasons for the recommendations I am proposing, and then give a Comparative Estimate of two methods, adopting, however, in the General Abstract of Estimates, that system which in my judgment and experience is most advisable.

To be laid on Kyanized Baulks of Timber.

I propose to lay down the Railway bars longitudinally, upon half baulks of timber, Kyanized, or impregnated with a solution of corrosive sublimate (chloride of mercury) according to a process patented by Mr. Kyan, which process is stated to be effective in preserving timber exposed to the alternations of moisture and dryness. If this process should not be found to be perfectly efficient, the impregnation of the timber with the chlorides of some of the salts having metallic bases (which have been stated to be effectual), might be tried; or the surface of the timber might be charred, or covered with coal tar, or other methods had recourse to for the longer preservation of the timber.

The fact that such timbers have been between two and three years laid down on the Dublin and Kingstown Railway, and the experimental piece of Railway thus laid not having since required any repairs or adjustment, will be considered good evidence in this matter.

Reason for not adopting Stone Blocks.

It was found that a very augmented wear and tear had taken place on that road, from the hard non-elastic effect of the chairs being bedded on granite blocks. These blocks are extremely massive, and were originally laid with the greatest care, and the chairs secured to them as completely as was then considered possible; but the almost perpetual stream of traffic of heavy trains of carriages, impelled by powerful locomotive engines, had gradually deranged the roads. It has been now for upwards of three years a continued contest between the impinging action of the trains and the *vis inertia* of the Railway. The resistance of the blocks and non-elastic road creating a much larger amount of positive wear than was suspected, both to the engines and carriages, and hence arose the mutual destruction of the Railway and of the vehicles moving on it.

When properly laid, the motion of trains on rails having a continuous bearing on longitudinal timber is much easier to the passengers; and though, probably, some amount of additional power may be required when the Railway is thus rendered somewhat elastic, this is much more than compensated by the saving of wear and tear, both of Railway and of the engines and carriages.

Such arguments, combined with their own daily observations, have induced the Directors of the Dublin and Kingstown Railway, at my recommendation, to substitute wood for stone; and they are now replacing, as expeditiously as possible, the whole of the granite blocks and transverse sleepers, with half baulks of timber laid longitudinally.

Though the Dublin and Kingstown Railway Directors have adopted these timbers, they have kept their old rails and chairs; but they have interposed a small additional support of cast iron between each chair, which the continuity of the longitudinal timbers allowed to be done with great facility. About half a mile of single way is, however, laid without chairs, the rails being simply fastened to the timbers by screws or spikes. The experiment, as well as the different modes of fastening the rails to the timber throughout, so as to give them a uniform and continuous bearing, will thus be fairly tried in different places.

The Board of the Great Western Railway, in England, as well as several other Companies, have also determined upon laying down longitudinal baulks of timber with wrought iron rails, adapted to be fastened to the wood without the intervention of chairs.

Cast Iron Rails not advisable.

I had at first supposed that cast iron rails might have been substituted for those of wrought iron; but a short experiment with them on the London and Birmingham Railway has shown that they are liable to break. It is also very difficult to cast them straight, and the saving is scarcely sufficient to compensate for these drawbacks. There are several advantages in the use of cast iron, but I fear the disadvantages are preponderant.

Scantling of Timber, and mode of laying.

The scantling of the timber, it would also appear from recent trials, should not be less than 5 or 6 inches in depth by 10 or 11 in breadth; in other words, about half a baulk.*

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*A whole baulk, but for the expense, would be better. To those Companies who cling to the adoption of the chair with a very heavy rail and long (5 feet) bearings, the laying of such upon whole baulks of timber disposed longitudinally, or even on half baulks is far preferable to stone blocks, or to transverse sleepers of wood.

Appendix A. No. 1.

Report on the South and South-western Lines of Railway.

Estimates. Continuous bearings

The road material should be well consolidated, and the baulks brought to a uniform bearing, in the first instance; and afterwards the gravel, sand, or broken stone, should be kept well packed under the timber. When transverse ties, either of wood or iron, are used, they should be placed so as to be quite clear of any bearing on the bed of the road, as the longitudinal timbers would otherwise not have a continuous rest upon the ground, which is indispensable to the success of the system. In like manner, to rest the longitudinal timbers on heads of, or to attach them to piles driven into the ground, is directly at variance with the principle of this method, as the timber is there supported at intervals, and not continuously.

The ties are simply as a precaution to keep the road in gauge. Probably the best and simplest mode of fastening down the rail, as well as for the ties, is to use iron rods of small diameter, having each end turned into a screw, on which close-fitting nuts, with or without washers and cotters, are to be placed.

Weight of Rail. The weight of the rail of wrought iron to be placed on those timbers would be sufficient at 42 to 45 lbs. per yard. Should the Engineer have doubts as to their strength, the weight may be increased to 50 lbs. to the yard of single rail.

Rails and Chairs. In the present ordinary mode of laying the upper works of Railways, chairs of about 16 to 18 lbs. each are fastened either to stone blocks or to transverse sleepers of larch, beech, or elm, at intervals of 3, 4, or 5 feet, according to the weight of the rail: every joint chair is somewhat longer, and, of course, heavier; say 21 to 22 lbs. I assume the weight of the rail to be 62 lbs. to the yard, the length 16 feet; the chairs placed 4 feet asunder; the spikes, or chair bolts, about 3 to the pound. A long experience on all the Railways has undoubtedly proved that a stout wedge or key of oak, elm, or other hard wood, compressed by strong rollers, or under a hydraulic press, is by far the most, indeed the only, effective mode of fastening the rail to the chair; for the wood, being compressed beyond the limits of any dryness it could possibly sustain by exposure to the changes of the atmosphere of this country, never gets loose.

Chair and Blocks. The present mode of securing the chair to the block, is to drill holes in the stone, to drop an oak plug therein, and to drive down a strong spike or chair bolt, with force sufficient to split the oak plug, which, thus expanding, secures the bolt, and keeps down the chair; but the action of the rail in the chair, when heavy trains pass over, has a great tendency to draw up the bolt from the stone, or to break off the head of the chair bolt.—Could the chair be as completely secured to the block as to the wood, it would be a great improvement. In the north of England oak pins are used in place of spikes or bolts, and they are stated to make a better fastening.

Having thus briefly noticed the leading points of the respective systems of Upper Works, I shall give the detailed cost of one mile of each, for a double track-way.

I. Upper Works, with Rails laid on longitudinal Timbers.

Cost per Mile of Upper Works, on Timber.

	£	s.	d.
American red pine—half baulks, with a sectional area of 72 inches, equal to 10,560 cubic feet, at 2*s.* 6*d.* per cubic foot, . . .	1,320	0	0
Wrought iron rails, 45 lbs. to the yard, rolled with lower flanges, and with 10 bolt holes drilled in each rail; 141$\frac{3}{7}$ tons, at £12 per ton, . .	1,697	2	10
Ties of $\frac{5}{8}$ths round iron to be put in at every length of 4 yards of single trackway, with nuts, say 880, at 1*s.* 6*d.*, ...	66	0	0
Screw bolts, with nuts, one at every yard on each flange of each rail, say 14,080, at 2*d.* each, ...	117	6	8
Laying the Railway, at 1*s.* 6*d.* per yard of double trackway, . .	132	0	0
Breadth of road to be gravelled 15 inches deep—4 cubic yards per yard forward, including broken stone, transverse drains, say 7,040 cubic yards, at 2*s.*,	704	0	0
Open rubble side-drains, set dry: containing half a cubic yard, or one cubic yard per yard forward, for both sides, 1,760 cubic yards, at 4*s.*, .	352	0	0
Total, .	£4,388	9	6

N.B.—In the following Tables this has been taken as £4,400 per mile, to bring the calculation to round numbers, being then 25*s.* per yard of single trackway.

II. Upper Works, with Rails laid on Chairs attached to Stone Blocks.

Cost per Mile with Stone Blocks.

	£	s.	d.
Stone blocks, containing each 5 cubic feet, and set 4 feet apart, dressed to receive the chairs, and drilled, say 5,280 blocks, at 3*s.* 6*d.* each, . .	924	0	0
Oak plugs, two for each block, say 10,560, at 50*s.* per thousand, .	26	8	0
Compressed oak keys or wedges, one for each chair, 5,280, at 4*d.* each, .	88	0	0
Chair bolts, about 3 to the pound, two for each chair, 10,560, at 1½*d.* each,	66	0	0
Cast iron chairs; single chair 18 lbs. each; joint chairs, 22 lbs.; average weight, 19 lbs. each, equal to 44$\frac{4}{5}$ tons at £10 per ton, . . .	448	0	0
Wrought iron rails, 62 lbs. to the yard, and rolled to the usual pattern; 194$\frac{86}{100}$ tons, at £12 per ton, ...	2,338	6	5
Laying the Railway, at 2*s.* per yard of double trackway, . . .	176	0	0
Breadth of road to be gravelled 15 inches deep—4 cubic yards per yard forward, including broken stone, transverse drains, say 7,040 cubic yards, at 2*s.*,	704	0	0
Boxing, that is, filling up between the blocks to the level of their tops, two cubic yards per yard forward—say, 3,520 cubic yards, at 1*s.* 6*d.*, .	264	0	0
Open rubble side-drains, set dry, containing ¾ths of a cubic yard, or 1½ cubic yard for both sides, in a yard forward; 2,640 cubic yards, at 4*s.*, .	528	0	0
Total,	£5,562	14	5
Cost, as per No. 1, . .	4,388	9	6
Saving, per mile, in favour of the system of longitudinal timbers, .	£1,174	4	11

On analyzing the preceding comparative estimates, it will be found that the saving arises almost entirely in the quantity of the iron, viz., upwards of 108 tons per mile; of which nearly one-half is saved, by dispensing with the chairs, and the other half is gained by the less weight requisite for the rail, when it has a continuous bearing throughout its whole length.

Principal Saving, with continuous Bearings, in the Weight of Iron.

It follows, as a consequence, that the greater the increase of the price of the iron in first cost, and from distance to be carried, the greater the gain, and *vice versa*. At £10 per ton, and iron can seldom be obtained lower, the saving would be still nearly £1000 per mile. The gain is, in fact, £100 per mile for every £1 per ton in the cost of the iron.

The other items, in the construction of the upper works, nearly balance each other, the additional cost of the timber being met by a corresponding reduction in the road material, and in the side drains; while the laying and fastening of the rails are nearly the same in both cases.

Advantages of continuous Bearings on Timber.

But, from less materials for the roads and drains being required, from the much greater facility with which the timber can be moved and placed without incumbering the road, the rails can be permanently laid with greater expedition. It is also certain, that a Railway thus laid, can be kept in repair and adjustment with much greater facility, and, of course, at considerably less cost than when laid with stone blocks and chairs.

Experience has proved that the boxing up between the blocks is absolutely necessary, while, on the longitudinal system, no gravelling or metalling around the timbers is requisite; on the contrary, they are better to be left perfectly clear, lying on the bed of the Railway like a ladder.

Upper Works on transverse Wood Sleepers.

The cost of laying a Railway on transverse sleepers of wood, with 62 lbs. wrought iron rails and chairs, averaging 19 lbs. each, the chairs and sleepers laid at 4 feet intervals, and each sleeper containing about 2 cubic feet of timber, would be about £500 per mile of double trackway less than the cost of the line laid on stone blocks. This system of laying Railways on transverse sleepers of larch, or other suitable timber, has been, and continues to be greatly used on those portions of lines where the embankments have not sufficiently consolidated; but this system does not admit of any diminution in the weight of the iron, and still requires the use of chairs.

Bearings adopted in England.

Several of the principal English Railway Companies are now adopting still heavier rails; portions of the Liverpool and Manchester Railway have been relaid with rails of 75 lbs. to the yard, and five feet intervals between the bearings; and one company has adopted 80 lb. rails. An increase of a few hundred pounds per mile arises by adopting such; but if the system of continuous bearings be not chosen, a 70 lb. rail with 3 feet 9 inches, or 5 feet bearings is the most advisable.* The form of this rail, as now almost universally adopted, is that having the top and one bottom web, or bottom exactly similar, and the rail equal throughout the whole length, being the section recommended by me in my Report on the best form of rails to be fastened into chairs, made some time since to the Directors of the London and Birmingham Railway. The upper works of a line thus laid, with the heaviest rails, and with chairs on stone blocks, may be fairly computed to amount, on an average, including the cost of the carriage and delivery of the iron, to £6000 per mile; and probably to £500 per mile less if laid on larch or Baltic timber sleepers.

The following comparative view of the cost, in round numbers, of several different systems of laying down the upper works of Railways may probably be of use for general reference. The adoption of that which, under all circumstances, may be best suited for the anticipated traffic of the country, may be left for after consideration, should the Commissioners not be prepared to acquiesce in my recommendation of the system of continuous bearings; but, should either of the more costly modes of constructing the upper works be chosen, that additional amount per mile must be added to the estimates:—

Comparative Cost of different Systems of Railway Upper Works.

COMPARATIVE COST OF DIFFERENT SYSTEMS OF RAILWAY UPPER WORKS.

Per Mile, of Double Trackway, including Draining.

Rails, 45 lbs. per yard, with continuous bearings, laid on longitudinal timbers, without chairs, - - - - . . - - -	£4,400
Rails, 42 lbs. per yard, with chairs and additional supports of cast iron between, laid on longitudinal timbers, as on the Dublin and Kingstown Railway, -	4,900
Rails, 42 lbs. per yard, with chairs laid on stone blocks, at three feet intervals,	5,300
Do. do. on transverse sleepers, do. -	4,800
Rails, 62 lbs. per yard, with chairs laid on stone blocks, at four feet intervals,	5,600
Do. do. on transverse sleepers, do. -	5,100
Rails, 75 lbs. to 80 lbs. per yard, with chairs laid on stone blocks, at five feet intervals, - - - - - - - - -	6,000
Do. do. on transverse sleepers, &c.	5,500

With these explanations of the principles on which the detailed Estimates have been made out, I subjoin the Abstracts of the several heads of work, classed according to the divisions previously enumerated.

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* The experience on the Liverpool and Manchester Railway has already proved that the expense of keeping in repair the Railway when laid with five feet bearings, very considerably exceeds (certainly is double) that of the way when laid with 3 feet 9 inches to 4 feet bearings; as indeed might have been expected, and the motion of the carriages over such long bearings after they have been some time laid down, is remarkably greater.

ABSTRACT OF

Reference.		GRAND DIVISIONS.	Distances.	EARTH WORK.					
Plan.	Section.			Total Number of Cube Yards.	Cube Yards per Mile.	Average Lead.	Average Price per Cube Yard.	Average Cost per Mile.	TOTAL COST.
		I. MAIN TRUNK LINE.	Miles.			Chains.	Pence.	£	£
I.*	A	Entrance into Dublin, Barrack-bridge to Inchicore Avenue	1¾	398,351	227,629	150	16.42	15,574	27,255
I.*	A	Sub-divisions. Inchicore Avenue to Celbridge Commons - -	9	626,556(a)	69,617	43	9.13	2,650	23,848
I. II.	A	Celbridge Commons to Rathangan - - -	24	2,087,941	86,998	67	10.60	3,839	92,136
II.	A	Rathangan to Maryborough Summit - -	19½	2,333,836	119,684	86	12.33	6,149	119,896
II. III.	B	Maryborough summit to Holycross - - -	37¼	3,757,265	100,865	55	9.75	4,097	152,623
		TOTALS - -	89¾	8,805,598	98,112	66	10.58	4,329	388,503
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c.;							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges, Stamps,							
		II. SHANNON LINE.							
IV.	C	Sub-divisions. Holycross to Donaghill, near Tipperary - -	13	947,068	72,851	76	11.56	3,513	45,664
V.	C	Donaghill, near Tipperary, to Limerick - -	22¾	2,185,555	96,068	16	7.80	3,140	71,433
VI.	D	Limerick to Tarbert - - - - - -	33½	3,006,379	89,713	65	10.23	3,825	128,147
		TOTALS - -	69¼	6,138,002	88,635	52	9.59	3,541	245,244
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c.;							
		Restoring Harbours, &c., interfered with, between Limerick and Tarbert, - - -							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges,							
		III. CORK LINE.							
IV. VII.	E	Sub-divisions. Holycross to Mallow - - - - - -	55¾	7,902,161	141,743	48	9.39	5,548	309,294
VIII.	F	Mallow to Cork - - - - - - -	21	4,104,725	195,463	74	10.80	8,809	184,996
		TOTALS - -	76¾	12,006,886	156,442	56	9.80	6,440	494 290
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c.;							
		Stationary Engine for the Inclined Plane, from Cork Barracks to the Harbour, Ropes, Pullies, Gearing,							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges,							
		IV. BEREHAVEN LINE							
VIII.	G	Sub-divisions. Blarney to Inchigeelagh - - - - - -	33¾	4,450,213	131,858	44	9.17	5,034	169,901
IX.	H	Inchigeelagh to Glengarriff - - - - -	17¾	3,466,519	195,297	33	8 66	7,004	124,325
IX. X.	H	Glengarriff to Berebaven - - - - - -	19½	3,398,865	174,300	30	8.51	6,184	120,591
		TOTALS - -	71	11,315,597	159,375	36	8.79	5,842	414,817
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c.;							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges,							
		V. LIMERICK AND WATERFORD LINE.							
XI.	I	Donaghill, near Tipperary, to Clonmel - -	24	2,229,122	92,880	67	10,34	4,005	96,108
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c.;							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges,							
		VI. KILKENNY LINE.							
XII.	K	Maryborough Summit to Kilkenny - - - -	26½	1,650,343	62,277	38	8.90	2,311	61,248
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c.;							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges,							
TOTALS.		I. Main Trunk Line, exclusive of the Entrance into Dublin II. Shannon Line.—V. Limerick and Waterford Line - VI. Kilkenny Line - - - - - - - - -	209½	18,823,065	89,847	62	10.09	3,776	791,103
		DITTO, - - - - - -	Including Carrying Establishment, Management, &c. &c. &c.						- -
		I. Main Trunk Line, including the Entrance into Dublin - II. Shannon Line, as far only as to Limerick - - - III. Cork Line.—V. Limerick and Waterford Line - -	228	26.572,580	116,546	63	10.15	4,926	1,123,253
		DITTO, - - - - - -	Including Carrying Establishment, Management, &c. &c &c						- -
		I. Main Trunk Line, including Entrance into Dublin - II. Shannon Line.—III. Cork Line - - - - - - V. Limerick and Waterford Line. VI. Kilkenny Line -	258	31,228,302	108,432	62	10.09	4 568	1,312,646
		DITTO, - - - - - -	Including Carrying Establishment, Management, &c. &c. &c.						- -
GRAND TOTALS.		All the Lines, Exclusive of Entrance into Dublin	357¼	42,145,548	117,972	54	9.68	4,759	1,700,210
		Ditto, Including Entrance into Dublin -	359	42,543,899	118.507	55	9.74	4,812	1.727,465
		Ditto, - - - - - - -	Including Carrying Establishment, Management, &c. &c. &c.						- -

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(a) The whole of the Cutting of Inchicore Hill, going to the Embankments, in the preceding Sub-division, none of it is computed either in price or quantity in this Sub-division.

(b) Chiefly Retaining Walls, at 7*s.* 6*d.* per cubic yard.

THE ESTIMATES.

MASONRY.								FENCING.		LAND.				UPPER WORKS, for Double Trackway.		Contingencies, 10 per cent on Railway Work and Land, and an additional 5 per cent on Totals, exclusive of the Carrying Establishments	GRAND TOTALS, including all Contingencies.	
BRIDGES.				Viaducts.	Tunnels.	Average Cost per Mile.	TOTAL COST.	Average Cost per Mile.	TOTAL COST.	Average No. of Acres per Mile.	Total Quantity.	Average Price, per Acre.	TOTAL COST.	Average Cost, per Mile.	TOTAL COST.		Average Cost per Mile.	TOTAL COST.
Roads, 1st Class.	Roads, 2nd Class.	Roads, 3rd Class, and Streams	Rivers and Canals.															
						£	£	£	£		Acres.	£	£	£	£	£	£	£
3	-	14	-	-	-	18,938	33,141(b)	880	1,540(c)	10(d)	18	809	14,562	4,400	7,700	8,419	52,925	92,618
3	6	20	-	-	-	840	7,562	440	3,960	13(e)	115	343	39,391	4,400	39,600	11,436	13,977	125,797
-	15	36	4	-	-	536	12,870	352	8,448	10¼	245	40	9,800	4,400	105,600	22,885	10,489	251,739
-	10	35	4	-	-	625	12,183	352	6,864	11⅜	223	30	6,690	4,400	85,800	23,143	13,055	254,576
1	25	60	3	-	-	544	20,248	352	13,112	10¾	400	30	12,000	4,400	163,900	36,189	10,686	398,072
4	56	151	11	-	-	589	52,863	361	32,384	11	983	69	67,881	4,400	394,900	93,653	11,478	1,030,184
additional Sidings and Crossings, Turnplates, &c. &c									-	-		-	-	-	-	-	-	100,000
Printing, Stationery, and Minor Contingencies, at 5 per cent										-			-	-	-	51,509	-	51,509
																145,162	13,166	1,181,693
-	12	16	1	-	-	475	6,178	352	4,576	10	129	45	5,805	4,400	57,200	11,942	10,105	131,365
2	13	53	1	-	-	714	16,236	352	8,008	12⅛	277	60	16,620	4,400	100,100	21,240	10,270	233,667
1	20	67	4	-	-	729	24,422	352	11,792	10⅐	340	50	17,000	4,400	147,400	32,876	10,795	361,637
3	45	136	6	-	-	676	46,836	352	24,376	10¾	746	53	39,425	4,400	304,700	66,058	10,493	726,639
additional Sidings and Crossings, Turnplates, &c. &c.									-	-		-	-	-	-	- -	-	60,000
-	-	-	-	-	-	-	-		-	-		-	-	-	-	- -	-	25,000
Stamps, Printing, Stationery, and Minor Contingencies, at 5 per cent.												-	-	-	-	36,332	-	36,332
																102,390	12,245	847,971
5	56	83	3	1	-	783	43,667	352	19,624	11⅔	650	60	39,000	4,400	245,300	65,688	12,961	722,573
4	13	41	3	-	-	966	20,292	352	7,392	14¾	311	50	15,550	4,400	92,400	32,063	16,795	352,693
9	69	124	6	1	-	833	63,959	352	27,016	12½	961	57	54,550	4,400	337,700	97,751	14,010	1,075,266
additional Sidings and Crossings, Turnplates, &c. &c.									-	-		-	-	-	-	- -	-	60,000
-	-	-	-	-	-	-	-		-	-		-	-	-	-	- -	-	15,000
Stamps, Printing, Stationery, and Minor Contingencies, at 5 per cent.												-	-	-	-	53,763	-	53,763
																151,514	15,688	1,204,029
4	12	53	3	2	1	2,424	81,805	352	11,680	10⅝	352	40	14,080	4,400	148,500	42,617	13,889	468,783
-	4	30	-	1	1	9,411	167,051	352	6,248	14	249	25	6,225	4,400	78,100	38,195	23,670	420,144
-	5	27	-	4	1	8,656	168,798	352	6,864	11⅔	228	25	5,700	4,400	85,800	38,775	21,872	426,528
4	21	110	3	7	3	5,882	417,654	352	24,992	11⅔	829	31	26,005	4,400	312,400	119,587	18,528	1,315,455
additional Sidings and Crossings, Turnplates, &c. &c.									-	-		-	-	-	-	- -	-	60,000
Stamps, Printing, Stationery, and Minor Contingencies, at 5 per cent.												-	-	-	-	65,773	-	65,773
																185,360	20,299	1,441,228
3	19	39	1	-	-	547	13,118	352	8,448	10	240	50	12,000	4,400	105,600	23,527	10,783	258,801
additional Sidings and Crossings, Turnplates, &c. &c.									-	-		-	-	-	-	- -	-	20,000
Stamps, Printing, Stationery, and Minor Contingencies, at 5 per cent.												-	-	-	-	12,940	-	12,940
																36,467	12,156	291,741
4	17	31	1	-	-	465	12,328	352	9,328	9	236	30	7,080	4,400	116,600	20,658	8,575	227,242
additional Sidings and Crossings, Turnplates, &c. &c									-	-		-	-	-	-	- -	-	20,000
Stamps, Printing, Stationery, and Minor Contingencies, at 5 per cent.												-	-	-	-	11,362	-	11,362
																32,020	9,759	258,604
14	137	357	19	-	-	597	125,145	356	74,536	10½	2,205	57	126,386	4,400	921,800	203,897	10,706	2,242,866
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	316,039	12,315	2,580,009
21	169	397	20	1	-	814	185,495	359	81,972	11 5/11	2,608	657	171,418	4,400	1,003,200	256,534	12,376	2,821,871
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	392,994	14,006	3,193,333
26	206	495	25	1	-	772	222,245	358	103,092	11	3,184	614	195,498	4,400	1,267,200	310,068	11,843	3,410,750
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	475,972	13,461	3,876,656
27	227	591	28	8	3	1,610	606,758	354	126,544	11⅕	3,995	52	206,941	4,400	1,571,900	421,233	12,970	4,633,588
30	227	605	28	8	3	1,782	639,899	357	128,084	11⅕	4,013	55	221,503	4,400	1,579,600	429,655	13,165	4,726,206
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	661,334	14,813	5,317,884

(c) The fencing will be chiefly Parapets on the top of the Retaining Walls of Masonry. for the remainder stone walls.

(d) The Railway though greatly elevated, and with land for four lines, is chiefly within retaining walls, which accounts for the small quantity of land required.

(e) Comprising land for four lines of Railway, including the usual space for slopes and fences.

Appendix A.
No. 1.

Report on the South and South-western Lines of Railway.

The preceding Estimates being those laid before the Commissioners last summer, were computed from the sections graduated to the most favourable inclinations, as tabulated in pages 12 and 13, where 16 feet to the mile, or 1 in 330, with certain exceptions on some of the lines, is the maximum gradient, and whence the ascents are progressive.

Inferior Gradients laid down and estimated for.

In preparing these lines for the Commissioners, I endeavoured to do so on the best principles, and to render them as perfect as the very limited time allowed would permit; but when I became aware that the traffic through many parts of Ireland might probably be considered insufficient to justify the full expenditure which a perfect system of inclinations requires, I prepared, on certain principles, a series of inferior gradients, and laid them down on the same profiles of the present surface of the country whereon the other gradients were drawn, and from thence deduced a second set of Estimates, which shows a diminution from the first, averaging rather more than £3000 per mile, supposing double lines of trackway laid throughout on each.

Further savings may be made, but these are equally applicable to both systems; and the comparison must be, that by adopting an inferior system of gradients, we obtain a saving of upwards of £3000 per mile, on the average of the whole 360 miles.

To proportion accurately the amount to be laid out in preparing a Railway, with the anticipated traffic and mode of working the road when completed, is equally the duty and the interest of the Engineer; for, in this country, his reputation depends even more on the profitable result of his works as commercial speculations, than as happy triumphs of art over natural difficulties; and hence he has every inducement to exercise the most rigid economy, not only in the principles whereon his designs are made, but in the minute details, which, in long lines, soon swell into important items of expenditure.

Inferior Gradients tabulated.

The inclinations on the reduced system are arranged in tables, upon the following pages, to correspond with the tables of the original gradients, with similar references to the plans and sections; and from these tables it will be very easy to lay down, by hand, upon the engraved detailed sections the lines of inferior gradients; it was, therefore, only considered necessary to engrave a diagram reference (which will be found in the Section Atlas, at the end of Part 1), corresponding to the sheet of the Diagram Index to the detailed sections, as previously described.

Estimates, pages 26 and 27.

From the sections thus regraduated, estimates of the cost of the reduced system were calculated in the same manner as for the original gradients, and Tabular Abstracts, corresponding precisely with those in pages 18 and 19, will be found in pages 26 and 27.

The mode in which the reduced gradients have been laid down is as follows:—No longer adhering to the mechanical axiom of avoiding descents or ascents, where it is necessary to rise or fall again, the Railway profiles have been undulated, that is, made to follow, generally, the undulating surface of the country; but upon the Main Trunk Line, from Dublin to Holycross, still not exceeding 16 feet to the mile, or 1 in 330, except at the entrance into Dublin, between King's-bridge to Chapelizod, 2 miles, at 1 in 230, or 23 feet per mile; and on the west of Spire Hill, where the rate is 22 feet to the mile, or 1 in 240 for 1½ mile; and also except at certain other points, where also very great extent of earth-work may be saved; and at such places not exceeding 26⅖ feet per mile, or 1 in 200.

Maximum Gradients on Main Trunk Line, 1 in 200, at three places only.

These inclinations only occur in three places, viz., at Spire Hill, between Portarlington and Monastereven, for 2⅓ miles; in surmounting the Maryborough summit for 2½ miles; and in ascending from the Valley of the Nore to the summit south of Borris-in-Ossory, in two planes of 1½ and 2¾ miles respectively, with an intermediate horizontal distance of two miles.

From recent experience on the English Railways, I am induced to think no very serious inconvenience will arise, for some time, by adopting the economical gradients of 1 in 200, even for the Main Trunk line; and should the future traffic so greatly increase as to render it necessary, the particular situation of these planes will enable assistant engines to be easily put on as occasion may require.

Saving on the Entrance into Dublin.

A most important reduction of cost is obtained by lowering the embanked entrance into Dublin, amounting to as much as £18,417 per mile, on the short length of 1¾ miles. This change was suggested by the Commissioners.

Sallins and Rathangan.

From Inchicore to Sallins there is no saving to be made by change of gradient; but between Sallins and Rathangan we gain about £1100 per mile; but between Rathangan and Maryborough summit the diminution is nearly £5000 per mile, and the average saving on the whole 89¾ miles of the Main Trunk line, from Inchicore to Holycross, is £2,408 per mile.

On the other lines the estimates are for a single trackway only; but in comparing the economy from change of Railway profile, I shall add for the second track.

The principal gain on the Shannon line is by not adhering to a continuous or progressive system of gradient; and the average cost is £2,147 per mile, less than by the first estimate. Only one gradient of 29⅓ feet per mile, or 1 in 180 occurs; it is in one length of five miles, up the Valley of the Dead River, between Lynfield and Donaghill; and here, if of importance, assistant power might be put on without great additional cost of working. In no other place is the inclination greater than 16 feet per mile.

On the Cork line the saving is most considerable, as the greatest changes have been made. To near Cashel we can still keep within 1 in 330; but to surmount the high ground there an incline is required of 35 feet per mile, or 1 in 150, for very nearly two miles. The descent, southward, from this summit is broken, and two planes are necessary; the first one, 1 in 150, for 1¼ mile; the second, 1 in 200, for 1⅓ mile; besides an intermediate declivity of 23⅗ feet per mile, or 1 in 224, for more than 1¼ mile. The extent of inferior gradients is here spread over seven miles; but as they lie between Cashel and the junction of the connecting branch towards Clonmel, where the Railway from Limerick to Waterford crosses the Cork Line, assistant engines might conveniently be placed hereon, either permanently, or as occasion required.

Ascent at Mallow.

From hence to the vicinity of Mallow, the prevailing inclination, not exceeded, is 21⅛ feet per mile, or 1 in 250. The locomotive engines will here seldom have to draw heavier loads than can be taken up such planes. The descent into Mallow is 1 in 200, for 1⅜ mile, and the ascent from thence to the Ballyhillogue summit requires two severe inclines of 1 in 100 (52⅘ feet per mile); each about two miles long, the intermediate gradient being 1 in 440, or 12 feet per mile, for 2½ miles. These planes of 1 in 100 could be reduced to planes of 1 in 150, of greater length, at an additional expense of about £25,000. As Mallow is an important station, it would not be inconvenient to keep assistant engines there to work the ascents in each direction. No other change of gradient occurs up to Blarney, between which place and Cork three planes, each about 1¼ mile long, and not exceeding 1 in 150, will effect a great saving. This distance being short, and between the terminus of Cork and the Berehaven junction, assistant power might be always in readiness. The average saving on the Cork Line, is £4,822 per mile.

Saving on Cork Line, £4,822 per Mile.

On the Berehaven Line I have been less scrupulous in introducing inclines of 1 in 100; between Blarney and the head of the Lakes of Inchygeelagh there are five, but only one of these exceeds three-fourths of a mile in length; almost all the other gradients are favourable. To the trains likely to travel over them, these short inclinations will, perhaps, not prove very detrimental. Similar inclines are introduced between Glengarriff Bay and Berehaven. Between Inchygeelagh and Glengarriff the original gradients are heavy, and the changes I propose, while saving a considerable expense, will not very greatly augment the difficulties of working. Indeed, in respect of the traffic on the Berehaven Line a heavy engine must be employed; which, with only two or three carriages, or waggons, would surmount, with facility, all the gradients of 1 in 100, and travel with proportionate increased rapidity and economy over the easier parts of the route. The average saving on the Berehaven Line, by adopting the inferior gradients, is £3,515 per mile; and I have no doubt that less than my estimates would complete the Railway communication from Blarney to Berehaven. When therefore, the line to Cork is constructed, the expenditure of an additional million to obtain the important objects and results which the establishment of a packet station at Berehaven would produce, must be deemed worthy of the deepest consideration of the Government and of the Public.

Saving on the Berehaven Line, £3,515 per Mile.

The difference on the Limerick and Waterford Line consists chiefly in undulating the profiles and increasing the gradients to 16 and 18 feet per mile: in addition to this, a short inclination of 1 in 100 for five-eighths of a mile, and another of the same gradient for 1⅛ mile, effect an economy of £2,739 per mile. The inclination into Clonmel is not altered.

Saving on the Limerick and Waterford Line, £2,737 per Mile.

On the Kilkenny Line the ground is naturally favorable, and by rising and falling, instead of the progressive descent first proposed, the saving amounts to £2,160 per mile, with no gradients exceeding 1 in 330.

Saving on the Kilkenny Line, £2,160 per Mile.

The following may be convenient for reference, as an

Abstract of the Cost of the two Systems.

ABSTRACT OF THE COST OF THE TWO SYSTEMS.

Per Mile of Double Trackway, including Carrying Establishment, and all contingencies.	Entrance into Dublin.	Main Trunk Line.	Shannon Line.	Cork Line.	Berehaven Line.	Limerick and Waterford Line.	Kilkenny Line.	Average of the whole.
	£	£	£	£	£	£	£	£
Original Gradients, -	52,925	13,166	12,245	15,688	20,299	12,156	9,759	14,813
Reduced Gradients, -	34,508	10,758	10,098	10,866	16.784	9,417	7,599	11,639
Ditto Single Trackway for all but Main Trunk Line,	34,508	10,758	8,098	8,866	14,784	7,417	5,599	10,149

The other principal saving which might be made in the cost of construction, arises by laying down only a single trackway: the amount thus to be economised may be taken at five-elevenths of the cost of the upper works, say £2,000 per mile, leaving £200 per mile for sidings and crossings. Under proper management, and with very long passing places between the principal stations, and particularly about midway between the most extreme points of the lines, a single trackway might be sufficient for all except the main trunk, and even thereon, beyond the Maryborough summit.

Saving of £2000 per Mile on the Upper Works, by adopting single Trackways.

I have latterly introduced beams of timber, trussed with wrought iron bars, in place of arches for Railway bridges, and that to a great extent on the Midland Counties Railway. On the North Union Railway I am erecting a viaduct of timber, of great height. Several similar works are constructing in the north of England, and on some Railways in Scotland I understand the system of trussed beams of timber has been applied to very large spans. In many instances, a considerable reduction in the cost of river and road bridges may be thus made, especially where the crossings are oblique, or where the additional height of arches would involve great expense of embanked approaches.

Should funds be short, and time and an expeditious opening of the lines be important, the earth-work in the heaviest excavations may be left in on one side to be removed afterwards, at night, or at such other times as the ordinary traffic will allow; in like mannner the embankments need not, at first be completed to their full width, though this is objectionable on account of the additional patch of embankment not uniting equally with the parts first made. I have, however, done so on part of the North Union Railway, between Newton and Wigan; the process of widening the cuttings and fillings having been carried quietly on without interruption to the traffic. I do not, however, recommend this process for general adoption, but cases will occur where it may be necessary; though, of course, the greater the intercourse the larger the amount of inconvenience in widening the bed of the Railway for the second line. I am also preparing to lay down the second trackway on this line, having worked with one road, only, for five or six years.

Appendix A. No 1.

Report on the South and South-western Lines of Railway.

I have bestowed much pains in arranging and elucidating the estimates, and in bringing out the averages of the different prices, numbers, and quantities. On comparing the two sets of Abstracts, the chief saving will be found to arise from the difference of the quantities of earth-work; the masonry, except for the retaining walls at Dublin, remaining nearly the same. A reduction in the price of the earth-work of full one penny per cubic yard, on an average of the whole, is got by the difference in the leads, in the original estimates being $9\frac{3}{4}$*d.*, and in the reduced estimates $8\frac{7}{10}$*d.*, only, per cubic yard.

Mr. Macneill's Tables

The estimates do not appear to me to require further explanation; but I cannot leave this division of my Report without hearing most ample testimony to the extreme accuracy and exceeding usefulness of Mr. Macneill's tables for computing earth-work and land. The saving of time, and the assurance of correctness can only be fully appreciated by those who, like myself and assistants, have tested them through many extensive series of calculations.

TABLES OF REDUCED GRADIENTS.

Main Trunk Line. Reduced Gradients.

I. MAIN TRUNK LINE.—Dublin to Holycross.

REMARKS, And nearest Principal Towns.	Reference to Sections.	Reference to Plans.	Distances from Dublin. Mls.	Distances from Dublin. Chns.	STATIONS.	Intermediate Distances. Mls	Intermediate Distances. Chs	Inclinations or Gradients. Per Mile	Inclinations or Gradients. Ratio.	Difference of Level. Feet.	Rise or Fall.	Height above Datum. Feet.
ENTRANCE into DUBLIN.	Section A.	Plan No. 1.*	0	00	Barrack-bridge	–		–	–	–	–	35
			0	30	King's Bridge Road	0	30	....	Horizontal	....	....	35
Zero of Mileage			1	60	Inchicore Avenue	1	30	23	1 in 230	32	R.	67
			0	00	Inchicore Avenue	–		–	–	–	–	67
CHAPELIZOD		Plan No. 1.*	0	50	Road to Chapelizod	0	50	23	1 in 230	14	R.	81
			5	00	Esker	4	50	16	1 - 330	70	R.	151
LEIXLIP			6	40	Doddsborough Quarries	1	40	....	Horizontal	....	....	151
			9	00	Mullingar Junction	2	40	$13\frac{1}{5}$	1 in 400	33	R.	184
CELBRIDGE		Plan No. 1.	11	40	Reeve's Castle	2	40	....	Horizontal	....	....	184
NAAS			18	20	Near Grand Canal	6	00	11	1 in 480	76	R.	257
		Plan No. 2.	22	20	Bog of Allen	4	00	1	1 - 5280	4	R.	261
First Summit			25	00	Hill of Allen	2	60	14	1 - 377	39	R.	300
KILDARE, 5 miles			27	00	Milltown Valley	2	00	16	1 - 330	32	F.	268
			27	60		0	60	....	Horizontal	....	....	268
			29	20	Drumcree	1	40	8	1 in 660	12	F.	256
			30	50	Kelmony	1	30	....	Horizontal	....	....	256
RATHANGAN			32	00	Rathangan Road	1	30	16	1 in 330	22	F.	234
			32	70	Grand Canal	0	70	$6\frac{7}{8}$	1 - 768	6	F.	228
			34	30	Ummarus Bog	1	40	6	1 - 880	9	F.	219
			35	50	Little Barrow River	1	20	16	1 - 330	20	F.	199
MONASTEREVEN			37	20	Valley of the Barrow	1	50	....	Horizontal	....	....	199
			38	50	Grand Canal	1	30	16	1 in 330	22	R.	221
PORTARLINGTON			40	60	Spire Hill	2	10	$26\frac{2}{5}$	1 - 200	56	R.	277
			42	20	Emo Bog	1	40	22	1 - 240	33	F.	244
			44	60		2	40	12	1 - 440	30	R.	274
MOUNTMELLICK, 4 miles MARYBOROUGH			45	60	Road to Mountmellick	1	00	10	1 - 528	10	R.	284
			47	20	Road to Maryborough	1	40	16	1 - 230	24	F.	260
			49	20	Cloncoher Castle	2	00	16	1 - 330	32	R.	292
Second Summit			51	60	Maryborough Summit	2	40	$26\frac{2}{5}$	1 - 200	66	R.	358
Kilkenny Junction	Section B.		52	40	Junction of Line from Kilkenny	0	60	16	1 - 330	12	F.	346
			53	00	Ross Bog	0	40	....	Horizontal	....	....	346
			53	60	Near River Cloncoos, and Mail Coach Road from Limerick	0	60	8	1 in 660	6	F.	340
			54	60	Clonadacasey Bog	1	00	16	1 - 330	16	R.	356
MOUNTRATH			56	00	Thurry	1	20	16	1 - 330	20	F.	336
CASTLETOWN			57	00	Mountrath Road	1	00	6	1 - 880	6	F.	330
			58	20	Valley of the Nore	1	20	14	1 - 377	17	F.	313
			59	60	Cudda	1	40	$26\frac{2}{5}$	1 - 200	41	R.	354
		Plan No. 3.	61	60	Aghavoe	2	00	....	Horizontal	....	....	354
3 miles to BOR-IN-OSSORY Third Summit			64	40	Summit	2	60	$26\frac{2}{5}$	1 in 200	72	R.	426
RATHDOWNY, 4 miles			66	00	Road to Donaghmore	1	40	16	1 - 330	24	F.	402
ROSCREA, 8 miles			67	00	Ballybrophy	1	00	....	Horizontal	....	....	402
			68	20	Ballymullen	1	20	16	1 in 330	20	R.	422
			69	70	River Garryduff	1	50	16	1 - 330	26	F.	396
			70	70	Branch of Erkin River	1	00	16	1 - 330	16	R.	412
			71	40	River Erkin	0	50	16	1 - 330	10	F.	402
			72	20	Dromard Bog	0	60	16	1 - 330	12	R.	414
			74	00	Dromard River	1	60	12	1 - 440	21	F.	393
			75	00	Ballysorrel River	1	00	7	1 - 754	7	F.	386
URLINGFORD 8 miles			76	40	Road to Bog	1	40	4	1 - 1320	6	R.	392
			78	00	Castle Liney River	1	40	8	1 - 660	12	F.	380
			78	60	Near the Washpin	0	60	....	Horizontal	....	....	380
TEMPLEMORE			80	00	Near Road to Templemore	1	20	8	1 in 660	10	R.	390
			83	00	River Suir	3	00	16	1 - 330	48	F.	342
THURLES			85	40	Thurles Lough	2	40	....	Horizontal	....	....	342
			86	40	Near Thurles	1	00	10	1 in 528	10	F.	332
HOLYCROSS			87	60	Beakstown	1	20	12	1 - 440	15	F.	317
			89	60	Holycross	2	00	3	1 - 1760	6	F.	311

Appendix A. No. 1.

Report on the South and South-western Lines of Railway.

Shannon Line. Reduced Gradients.

TABLES OF REDUCED GRADIENTS—*(continued.)*

II. SHANNON LINE.—Holycross to Tarbert.

REMARKS, And nearest Principal Towns.	Reference to		Distances from Dublin.		STATIONS.	Intermediate Distances.		Inclinations or Gradients.		Difference of Level.	Rise or Fall.	Height above Datum
	Sections.	Plans.	Mls.	Chns.		Mls	Chs.	Per Mile.	Ratio.	Feet.		Feet.
HOLYCROSS -	Section C.	Plan No. 4.	89	60	Holycross - - -	–		–	–	–	–	311
			92	40	Near Milltown Castle -	2	60	16	1 in 330	44	F.	267
			94	40	Woodford Forge - -	2	00	16	1 - 330	32	R.	299
			95	40	Ballagh - - -	1	00	11	1 - 480	11	R.	310
			98	00	Dundrum - - -	2	40	8	1 - 660	20	F.	290
Junction with Line from Waterford			101	00	Kilpatrick Road	3	00	16	1 - 330	48	R.	338
TIPPERARY, 5 miles -			102	60	Donaghill, near Tipperary - -	1	60	16	1 - 330	28	F.	310
		Plan No. 5.	107	60	Dead River - -	5	00	29⅓	1 - 180	148	F.	162
CAPPAMORE, 3 miles -			113	40	Near Lynfield - -	5	60	3½	1 - 1518	20	F.	142
			114	00		0	40	12	1 - 440	6	R.	148
			114	40		0	40	12	1 - 440	6	F.	142
ABINGTON -			115	60	Near Britts Abbey -	1	20	8	1 - 660	10	R.	152
CAHIRCONLISH			118	00		2	20	16	1 - 330	36	F.	116
			119	00	Near High Park - -	1	00	11	1 - 480	11	R.	127
			120	00	Carriga Parson - -	1	00	2	1 - 2640	2	R.	129
LIMERICK - -			125	40	Lunatic Asylum at Limerick - -	5	40	16	1 - 330	88	F.	41
	Section D.	Plan No. 6.	127	50	Near Ballinacurra Bridge	3	10	16	1 - 330	34	F.	7
			129	40	Corrigar - - -	1	70	16	1 - 330	30	R.	37
			131	5	Road to Kilkeedy -	1	45	16	1 - 330	25	F.	12
ADARE, 5 miles			132	45	Valley of River Maig -	1	40	4	1 - 1320	6	F.	6
			134	20		1	55	....	Horizontal	..	....	6
PALLAS - -			136	00	Road to Pallas - -	1	60	16	1 in 330	28	R.	34
			136	40		0	40	8	1 - 660	34	R.	38
			138	60	Near Road to Milltown	2	20	16	1 - 330	36	R.	74
ASKEATON -			141	30	Near River at Askeaton	2	50	16	1 - 330	42	F.	32
			142	20		0	70	....	Horizontal	..	....	32
			143	00		0	60	12	1 in 440	9	F.	23
			143	50	Old Road to Tarbert -	0	50	10	1 - 528	6	R.	29
			145	00	Fannamore - - -	1	30	16	1 - 330	22	F.	7
			145	30	Old Road - - -	0	30	16	1 - 330	6	R.	13
SHANAGOLDEN 3 miles -			145	70	Ahinish Island - -	0	40	12	1 - 440	6	F.	7
			150	00	Near Mount Trenchard	4	10	....	Horizontal	..	....	7
			150	40		0	40	6	1 in 880	3	R.	10
LOGHILL - -			151	00	Near Loghill Bay -	0	40	6	1 - 880	3	F.	7
			153	20	Rock Lodge - -	2	20	....	Horizontal	..	....	7
			153	60	Killery - - -	0	40	6	1 in 880	3	R.	10
			154	60	Along Cliffs - -	1	00	....	Horizontal	..	....	10
			155	45		0	65	7½	1 in 704	6	R.	16
GLYN - -			156	20	Near mouth of Glyn River	0	55	13	1 - 406	9	F.	7
			157	00		0	60	....	Horizontal	..	....	7
			157	30	Ballyhowlan - -	0	30	16	1 in 330	6	R.	13
			157	60	Ballydonough - -	0	30	16	1 - 330	6	F.	7
TARBERT - -			159	00	Tarbert Bay - -	1	20	....	Horizontal	..	....	7

III. CORK LINE.—Holycross to Cork.

Cork Line.

REMARKS, And nearest Principal Towns.	Reference to		Distances from Dublin.		STATIONS.	Intermediate Distances.		Inclinations or Gradients.		Difference of Level.	Rise or Fall.	Height above Datum
	Sections.	Plans.	Mls.	Chns.		Mls	Chs	Per Mile.	Ratio.	Feet.		Feet.
HOLYCROSS -	Section E.	Plan No. 6.	89	60	Holycross - - -	–		–	–	–	–	311
			91	20		1	40	12	1 in 440	18	R.	329
			92	00		0	60	16	1 - 330	12	F.	317
			93	00	Near Road to Two-Ford Bridge - -	1	00	....	Horizontal	..	....	317
			94	00	Ballytarsna - - -	1	00	13	1 in 406	13	R.	330
			96	60	Valley of Thurles-Begriver	2	60	16	1 - 330	44	F.	286
CASHEL - -			98	00	Near Cashel - -	1	20	13⅕	1 - 400	17	R.	303
Summit - -			99	75	Near Shanbally Road -	1	75	35	1 - 150	68	R.	371
			101	20	Road to Race Course -	1	25	23⅗	1 - 224	31	F.	340
			102	40		1	20	35	1 - 150	44	F.	296
			103	60	Near Road to New Inn	1	20	17	1 - 310	21	F.	275
Limerick & Waterford Line crosses			105	20	Road to New Inn -	1	40	26⅖	1 - 200	39	F.	236
			106	20	Near Road to Knock-Graffon - -	1	00	....	Horizontal	..	....	236
			107	00	River Suir and Valley	0	60	8	1 in 660	6	F.	230
CAHIR - -		Plan No. 7.	107	20		0	20	....	Horizontal	..	....	230
			109	70	Near Road into Cahir -	2	50	17	1 in 310	45	R.	275
CLOGHEEN, 4 miles			112	00	Deer Park - - -	2	10	....	Horizontal	..	....	275
			115	10	Upper Kennedy - -	3	10	21⅛	1 in 250	66	R.	341
			117	70	Near Road to Ballyporeen	2	60	....	Horizontal	..	....	341
BALLYPOREEN Summit - -			119	50	Near the Caves - -	1	60	21⅛	1 in 250	37	R.	378
			120	30	Draebawn River - -	0	60	....	Horizontal	..	....	378
			123	00	Kilbegney Castle - -	2	50	21⅛	1 in 250	56	F.	322

Appendix A. No. 1.

Report on the South and South-western Lines of Railway.

Cork Line.

Reduced Gradients.

TABLES OF REDUCED GRADIENTS—*(continued.)*

III. CORK LINE.—Holycross to Cork—*(continued.)*

REMARKS, And nearest Principal Towns.	Reference to		Distances from Dublin.		STATIONS.	Intermediate Distances.		Inclinations or Gradients.		Difference of Level.	Rise or Fall.	Height above Datum.
	Sections.	Plans.	Miles.	Chns.		Mls	Chns	Per Mile.	Ratio.	Feet.		Feet.
MITCHELSTOWN GLANWORTH, 5 miles	Section E.	Plan No.7.	123	50	Near Mitchelstown	0	50	....	Horizontal	..	....	322
			130	20	Marshalstown	6	50	21⅛	1 in 250	140	F.	182
KILDORERY			132	20	Kildorery	2	00	11	1 in 480	22	R.	204
			133	20		1	00	....	Horizontal	..	....	204
			134	30		1	10	16	1 in 330	18	R.	222
			135	00		0	50	....	Horizontal	..	....	222
CASTLETOWN-ROCHE, DONERAILE, 4 miles			136	40	Owbeg River	1	40	21⅛	1 in 250	32	F.	190
			137	40		1	00	2	1 in 2640	2	R.	192
			139	10	Shanakilty	1	50	....	Horizontal	..	....	192
			140	10		1	00	16	1 in 330	16	R.	208
BUTTEVANT 6 miles MALLOW			141	30	Anakishey Stream	1	20	16	1 - 330	20	F.	188
			142	70	Ballyclough	1	40	21⅛	1 - 250	32	R.	220
			144	60	Spa Glen	1	70	26⅖	1 - 200	53	F.	167
	Section F.	Plan No.8.	145	60	River Blackwater	1	00	....	Horizontal	..	....	167
			147	70	River Clydagh	2	10	52⅘	1 in 100	117	R.	284
			150	30	Near Anahntha Valley	2	40	12	1 - 440	40	R.	314
Summit			152	30	Ballyhillogue	2	00	52⅘	1 - 100	106	R.	420
			158	30	Ballymartin	6	00	25	1 - 211	150	F.	270
Junction of Line to Inchygeelagh and Berehaven			160	00	Blarney	1	50	11	1 - 480	18	F.	252
			161	10	Blarney Bog	1	10	34 7/10	1 - 152	39	F.	213
			162	10	Near Iron Works	1	00	8	1 - 660	8	F.	205
			163	20	Road to Mallow	1	10	31	1 - 170	35	R.	240
			164	40	Beggars' Glen	1	20	35	1 - 150	45	F.	195
			166	00	Barrack Gate	1	40	10	1 - 528	15	R.	210
CORK			166	45	Glanmire Road At Cork,	0	45	Inclined plane	1 - 16	180	F.	30
			166	50	Cork Harbour	0	5	....	Horizontal	....	....	30

Berehaven Line.

IV. BEREHAVEN LINE.—Blarney to Berehaven.

REMARKS, And nearest Principal Towns.	Reference to		Distances from Dublin.		STATIONS.	Intermediate Distances.		Inclinations or Gradients.		Difference of Level.	Rise or Fall.	Height above Datum.
	Sections.	Plans.	Miles.	Chns.		Mls	Chns	Per Mile.	Ratio.	Feet.		Feet.
Junction with Cork Line	Section G.	Plan No. 8.	160	00	Blarney Junction	–		–	–	–	–	252
			160	60	River Martin,	0	60	52⅘	1 in 100	40	F.	212
			161	70	Near Cross Valley,	1	10	12⅖	1 - 425	14	F.	198
			162	40	River Shawnagh (near)	0	50	52⅘	1 - 100	33	F.	165
			163	40	River Shawnagh	1	00	22	1 - 240	22	F.	143
			164	20		0	60	....	Horizontal	...	....	143
			166	00	Valley of the River Lee	1	60	24½	1 in 215	43	F.	100
			168	00	Near River Bride	2	00	12	1 - 440	24	R.	124
			168	50		0	50	52⅘	1 - 100	33	R.	157
BANDON 7 miles			170	00	Near Kilcree Castle	1	30	....	Horizontal	...	....	157
			171	40		1	40	8	1 in 660	12	F.	145
			173	00	Near Ryes Court	1	40	6	1 - 880	9	R.	154
			176	00	Cork Road	3	00	16	1 - 330	48	R.	202
			176	40		0	40	26⅖	1 - 200	13	R.	215
			177	10	Shandangan	0	50	52⅘	1 - 100	33	R.	248
			178	60	Near Warrenscourt	1	50	16	1 - 330	26	F.	222
MACROOM			180	20	Near Road into Macroom	1	40	....	Horizontal	...	....	222
			181	20	Near Toom	1	00	5	1 in 1056	5	F.	217
			183	70	Near Drumcarrow Castle	2	50	13	1 - 406	34	R.	251
			184	60	Valley of the River Lee	0	70	16	1 - 330	14	F.	237
			186	70	Carrinacurragh	2	10	8	1 - 660	17	R.	254
INCHYGEELAGH			187	55	Near Inchygeelagh	0	65	52⅘	1 - 100	43	R.	297
			189	00	River Lee	1	25	12	1 - 440	16	F.	281
			190	00		1	00	2	1 - 2640	2	R.	283
			192	00	Along Inchygeelagh Lakes	2	00	1½	1 - 3520	3	R.	286
	Section H.		194	00		2	00	1½	1 in 3520	3	R.	289
		Plan No. 9.	196	20	Near Road to Gouganbarry Lake	2	20	35⅕	1 - 150	79	R.	368
			197	40	North End of Tunnel	1	20	52⅘	1 - 100	67	R.	435
			199	00	Pass of Cummineer	1	40	30	1 - 176	45	R.	480
			201	00	Maulavanig	2	00	35	1 - 151	70	F.	410
			202	20		1	20	22½	1 - 235	28	F.	382
			204	00	Treenamadrea	1	60	32	1 - 165	56	F.	326
			205	00	Deep Cross Valley	1	00	52⅘	1 - 100	53	F.	273
			206	20		1	20	16	1 - 330	20	F.	253
BANTRY 5 miles			207	20	Coomhoola Valley	1	00	52⅘	1 - 100	53	F.	200
			210	70	Road to Glengarriff	3	50	26⅖	1 - 200	96	F.	104
		No. 10.	212	10	Garnish Island	1	20	52⅘	1 - 100	66	F.	38
			212	50	W. Side of Glengarriff Bay	0	40	....	Horizontal	...	....	38
			213	40		0	70	52⅘	1 in 100	47	R.	85

TABLES OF REDUCED GRADIENTS—(*Continued.*)

IV. BEREHAVEN LINE.—BLARNEY TO BEREHAVEN—(*Continued.*)

Berehaven Line.
Reduced Gradients.

REMARKS, And nearest Principal Towns.	Reference to Sections.	Reference to Plans.	Distances from Dublin. Miles.	Distances from Dublin. Chns.	STATIONS.	Intermediate Distances. Mls	Intermediate Distances. Chs	Inclinations or Gradients. Per Mile.	Inclinations or Gradients. Ratio.	Difference of Level. Feet.	Rise or Fall.	Height above Datum. Feet.
	Section H.	Plan No. 9.	214	20	Near Bowearna Strand -	0	60	52⅘	1 - 100	39	F.	46
			215	20		1	00	20	1 - 264	20	R.	66
			215	60	Trahashal Bay - -	0	40	20	1 - 264	10	F.	56
			216	20	Along Cliffs - -	0	40	48	1 - 110	24	R.	80
			216	60		0	40	20	1 - 264	10	F.	70
			217	60		1	00	....	Horizontal	...	....	70
			218	20		0	40	20	1 in 264	10	F.	60
			218	60		0	40	....	Horizontal	...	....	60
			219	50	Roosk - - - -	0	70	19 4/10	1 in 272	17	R.	77
			220	50	Trafrask Bay - -	1	00	52⅘	1 - 100	53	F.	24
			221	60	Berehaven Road - -	1	10	16	1 - 330	18	R.	42
			222	70	Adrigoole Bay - -	1	10	16	1 - 330	18	F.	24
			223	20	Along North Shores of Bantry Bay - -	0	30	52⅘	1 - 100	21	R.	45
			223	60		0	40	20	1 - 264	10	F.	35
			224	60		1	00	20	1 - 264	20	R.	55
			225	60		1	00	20	1 - 264	20	F.	35
			226	20		0	40	....	Horizontal	...	....	35
			227	00	Sullivan's Bank - -	0	60	20	1 in 264	15	R.	50
			227	40	White's Cottage, - -	0	40	....	Horizontal	...	....	50
			228	10		0	50	20	1 in 264	12	R.	62
			229	30	Road to Castletown -	1	20	20	1 - 264	25	F.	37
			229	70	Mr. Sullivan's - -	0	40	12	1 - 440	6	R.	43
CASTLETOWN, or BEREHAVEN			231	00	Boat Channel - -	1	10	20	1 - 264	23	F.	20
			231	20	Dinish Island - -	0	20	....	Horizontal	...	....	20

V. LIMERICK AND WATERFORD LINE.—DONAGHILL, NEAR TIPPERARY, TO CLONMEL.

Limerick and Waterford Line.

REMARKS, And nearest Principal Towns.	Reference to Sections.	Reference to Plans.	Distances from Limerick. Mls.	Distances from Limerick. Chns.	STATIONS.	Intermediate Distances. Mls	Intermediate Distances. Chs	Inclinations or Gradients. Per Mile.	Inclinations or Gradients. Ratio.	Difference of Level. Feet.	Rise or Fall.	Height above Datum. Feet.
TIPPERARY, 5 miles	Section I.	Plan Nos. 4 and 11.	23	00	Donaghill - - - -	–		–	–	–	–	310
			26	40	Near Donaskeagh Chapel	3	40	....	Horizontal	..	....	310
GOLDEN - -			31	30	Valley of the Suir - -	4	70	18	1 in 293	89	F.	221
			32	20	Cloughleigh - - -	0	70	16	1 - 330	14	R.	235
			33	10	Near Hemingston - -	0	70	16	1 - 330	14	F.	221
Crosses Cork Line -			36	30	Crosses Cork Line - -	3	20	16	1 - 330	52	R.	273
			37	00	Near Road to New Inn -	0	50	52⅘	1 - 100	33	F.	240
			41	00	Cahir & Clonmel, old road	4	00	18	1 - 293	72	R.	312
			42	00	Near Woodruffe - -	1	00	14	1 - 377	14	F.	298
			43	10	Joins Old L. and W. Line	1	10	52⅘	1 - 100	59	F.	239
CLONMEL - -			47	00	About a mile W. Clonmel	3	70	35	1 - 151	135	F.	104

VI. KILKENNY LINE.—MARYBOROUGH SUMMIT TO KILKENNY.

Kilkenny Line.

REMARKS, And nearest Principal Towns.	Reference to Sections.	Reference to Plans.	Distances from Dublin. Mls.	Distances from Dublin. Chns.	STATIONS.	Intermediate Distances. Mls	Intermediate Distances. Chs	Inclinations or Gradients. Per Mile.	Inclinations or Gradients. Ratio.	Difference of Level. Feet.	Rise or Fall.	Height above Datum. Feet.
MARYBOROUGH Summit -	Section K.	Plan No. 12.	52	40	Maryborough Summit -	–		–	–	–	–	346
			53	60	Coolanacartron - -	1	20	4	1 in 1320	5	F.	341
			55	20	Bog Stream - - -	1	40	6	1 - 880	9	R.	350
BALLYROAN -			57	10	Corbally - -	1	70	16	1 - 330	30	F.	320
			58	10	Roads into Abbeyleix	1	00	2	1 - 2640	2	R.	322
			59	40		1	30	16	1 - 330	22	F.	300
ABBEYLEIX -			60	30		0	70	8	1 - 660	7	R.	307
			61	30	Abbeyleix Bog -	1	00	16	1 - 330	16	R.	323
			63	00		1	50	16	1 - 330	26	F.	297
BALLINAKILL -			63	20	Road from Ballinakill -	0	20	....	Horizontal	..	....	297
DURROW - -			66	00	Road to Durrow - -	2	60	13⅘	1 in 383	38	F.	259
			67	5	Near River Owbeg -	1	5	16	1 - 330	17	F.	242
			67	30		0	25	16	1 - 330	5	R.	247
BALLYRAGGET -			68	10	Road into Ballyragget -	0	60	16	1 - 330	12	F.	235
CASTLECOMER, 4 miles - -			69	5		0	75	....	Horizontal	..	....	235
			70	10		1	5	16	1 in 330	17	F.	218
			70	50	Road from Kilkenny -	0	40	2	1 - 2640	1	R.	219
			71	20		0	50	16	1 - 330	10	F.	209
FRESHFORD, 3 miles			72	00		0	60	....	Horizontal	..	....	209
			72	60	Ballycarron - - -	0	60	12	1 in 440	9	F.	200
			73	10	River Dinan Valley	0	30	13⅕	1 - 400	5	R.	205
			75	50		2	40	14⅘	1 - 357	37	F.	168
			76	50		1	00	13	1 - 406	13	R.	181
			77	10	Dublin Road - -	0	40	6	1 - 880	3	R.	184
			77	60	Near Castlecomer Road	0	50	13	1 - 406	8	R.	192
KILKENNY - -			79	00	Kilkenny Barracks -	1	20	16	1 - 330	20	F.	172

ABSTRACT OF THE ESTIMATES

Reference.		GRAND DIVISIONS.	Distances.	EARTH WORK.					
Plan.	Section.			Total Number of Cube Yards.	Cube Yards per Mile.	Average Lead.	Average Price per Cubic Yard.	Average cost per Mile.	TOTAL COST.
		I. MAIN TRUNK LINE.	Miles.			Chains.	Pence.	£	£
I.*	A	Entrance into Dublin—Barrack-bridge to Inchicore Avenue	1¾	254.111	145,206	130	1,447	8,753	15,319
I.*	A	Sub-divisions. Inchicore Avenue to Celbridge Commons	9	626,556(a)	69,617	43	9.13	2,650	23,848
I. II.	A	Celbridge Commons to Rathangan	24	1,946,367	81,107	33	8.63	2,917	70,004
II.	A	Rathangan to Maryborough Summit	19½	1,064,220	54,575	56	9 79	2,227	43,420
II. III.	B	Maryborough Summit to Holycross	37¼	1,946,492	52,254	51	9.55	2,079	77,456
		TOTALS - -	89¾	5,583,835	62,216	45	9.23	2,392	214,728
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges, Stamps,							
		II. SHANNON LINE.							
IV.	C	Sub-divisions. Holycross to Donaghill, near Tipperary	13	587,041	45,157	12	7.60	1,429	18,581
V.	C	Donaghill, near Tipperary, to Limerick	22½	1,876,750	82.494	7	7.34	2,523	57,404
VI.	D	Limerick to Tarbert	33¼	2,144,342	64,010	24	8.22	2,193	73,483
		TOTALS - -	69¼	4,608,133	66,543	16	7.79	2,158	149,468
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c.							
		Restoring Harbours, &c., interfered with between Limerick and Tarbert, - - -							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges,							
		III. CORK LINE.							
IV. VII.	E	Sub-divisions. Holycross to Mallow	55¾	3,625,202	65,026	44	9.18	2,487	138,645
VIII.	F	Mallow to Cork	21	1,762,134	83,911	32	8.58	2,996	62,981
		TOTALS - -	76¾	5,387,336	70,193	40	8.98	2,627	201,626
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c.							
		Stationary Engine for the Inclined Plane from Cork Barracks to the Harbour, Ropes, Pullies, Gearing,							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges,							
		IV. BEREHAVEN LINE.							
VIII.	G	Sub-divisions. Blarney to Inchygeelagh,	33¾	1,760,443	52,161	30	8.51	1,851	62,455
IX.	H	Inchygeelagh to Glengarriff	17¾	2,704,001	152,338	30	8 50	5,398	95,822
IX. X.	H	Glengarriff to Berehaven	19½	1,514,731	77,678	24	8 18	2,648	51,645
		TOTALS - -	71	5,979,175	84,214	29	8.43	2,957	209,922
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges, Stamps,							
		V. LIMERICK AND WATERFORD LINE.							
XI.	I	Donaghill, near Tipperary, to Clonmel - -	24	1,284,150	53,506	42	9.10	2,029	48,699
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c.							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges Stamps,							
		VI. KILKENNY LINE.							
XII.	K	Maryborough Summit to Kilkenny - -	26½	672,247	25,368	22	8.12	858	22,746
		Carrying Establishment, including Engines, Carriages, Waggons, Stations, Sheds, and Workshops, &c							
		Parliamentary, Engineering, and Legal Expenses, Direction, Office Establishment, Travelling Charges, Stamps,							
TOTALS.		I. Main Trunk Line, exclusive of the Entrance into Dublin II. Shannon Line.—V. Limerick and Waterford Line - VI. Kilkenny Line - - - - - - - -	209½	12,148,365	57,987	21	8.06	2,080	435,641
		DITTO, - - - - - -	Including Carrying Establishment, Management, &c., &c. - - - -						
		I. Main Trunk Line, including the Entrance into Dublin II. Shannon Line, as far only as to Limerick - - - III. Cork Line.—V. Limerick and Waterford Line - -	228	14,973,223	65,671	38	8.92	2,440	556,356
		DITTO, - - - - - -	Including Carrying Establishment, Management, &c., &c. - - - -						
		I. Main Trunk Line, including the Entrance into Dublin - II. Shannon Line.—III. Cork Line - - - - - - V. Limerick and Waterford Line. VI. Kilkenny Line -	288	17,789,812	61,770	36	8.80	2,266	652,585
		DITTO, - - - - - -	Including Carrying Establishment, Management, &c. &c. - - - -						
GRAND TOTALS.		All the Lines, Exclusive of Entrance into Dublin	357¼	23,514,876	65,822	33	8.64	2,371	847,189
		DITTO, Including Entrance into Dublin -	359	23,768,987	66,209	34	8.70	2,403	862,507
		DITTO,	Including Carrying Establishment, Management, &c., &c. - - -						

(a) The whole of the cutting of Inchicore Hill, going to the Embankments in the preceding Sub-division, none of it is computed, either in price or quantity, in this Sub-division.

(b) Chiefly Retaining Walls, at 7*s.* 6*d.* per cubic yard.

(c) The Fencing will be chiefly Parapets on the top of the Retaining Walls of Masonry: for the remainder, stone walls.

ON THE REDUCED GRADIENTS.

MASONRY.								FENCING.		LAND.				UPPER WORKS, for Double Trackways		Contingencies, 10 per Cent. on Railway Work and Land, and an additional 5 per Cent on Totals, exclusive of the Carrying Establishments.	GRAND TOTALS, including all Contingencies.	
BRIDGES.				Viaducts.	Tunnels.	Average Cost per Mile.	TOTAL COST.	Average Cost per Mile.	TOTAL COST.	Average No. of Acres per Mile.	Total Quantity.	Average Price per Acre.	TOTAL COST.	Average Cost per Mile.	TOTAL COST.		Average cost per Mile	TOTAL COST.
Roads, 1st Class.	Roads, 2nd Class.	Roads, 3rd Class, and Streams.	Rivers and Canals.															
						£	£	£	£	£	Acres.	£	£	£	£	£	£	£
3	0	14	–	–	–	9,017	15,779(b)	880	1,540(c)	10(d)	18	809	14,562	4,400	7,700	5,490	34,508	60,389
3	6	20	–	–	–	840	7,562	440	3,960	13(e)	115	343	39,391	4,400	39,600	11,436	13,977	125,797
-	15	24	4	–	–	456	10,939	352	8,448	9$\frac{7}{12}$	230	40	9,200	4,400	105,600	20,419	9,359	224,610
-	10	25	4	–	–	463	9,032	352	6,864	9⅜	184	30	5,520	4,400	85,800	15,064	8,497	165,700
1	25	41	3	–	–	429	15,995	352	13,112	8¾	325	30	9,750	4,400	163,900	28,021	8,275	308,234
4	56	110	11	–	–	485	43,528	361	32,384	9½	854	75	63,861	4,400	394,900	74,940	9,185	824,341
Additional Sidings and Crossings, Turnplates, &c., &c.								-	-	-	-	-	-	-	-	-	-	100,000
Printing, Stationery, and Minor Contingencies, at 5 per cent.									-	-	-	-	-		-	41,217	-	41,217
																116,157	10,758	965,558
-	12	10	1	–	–	380	4,937	352	4,576	8½	111	45	4,995	2,400	31,200	6,429	5,440	70,718
2	13	41	1	–	–	561	12,764	352	8,008	9¼	210	60	12,600	2,400	54,600	14,538	7,029	159,914
1	20	50	4	–	–	633	21,217	352	11,792	9⅜	308	50	15,400	2,400	80,400	20,229	6,642	222,521
3	45	101	6	–	–	562	38,918	352	24,376	9	629	52	32,995	2,400	166,200	41,196	6,544	453,153
Additional Sidings, and Crossings, Turnplates, &c., &c.								-	-	-	-	-	-	-	-	-	-	60,000
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25,000
Stamps, Printing, Stationery, and Minor Contingencies, at 5 per cent.											-	-	-		-	22,657	-	22,657
																63,853	8,098	560,810
5	56	55	3	2	–	850	47,368	352	19,624	9½	529	60	31,740	2,400	133,800	37,117	7,324	408,294
4	13	30	3	2	–	1,022	21,456	352	7,392	10¼	216	50	10,800	2,400	50,400	15,303	8,016	168,332
9	69	85	6	4	–	897	68,824	352	27,016	9¾	745	57	42,540	2,400	184,200	52,420	7,513	576,626
Additional Sidings and Crossings, Turnplates, &c., &c.								-	-	-	-	-	-	-	-	-	-	60,000
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15,000
Stamps, Printing, Stationery, and Minor Contingencies, at 5 per cent.											-	-	-		-	28,831	-	28,831
																81,251	8,866	680,457
4	12	36	3	3	1	2,837	95,748	352	11,880	8½	288	40	11,320	2,400	81,000	26,240	8,552	288,643
–	4	21	–	1	1	9,303	165,122	352	6,248	12½	221	25	5,525	2,400	42,600	31,532	19,541	346,849
–	5	17	–	4	1	8,688	169,417	352	6,864	9	176	25	4,400	2,400	46,800	27,913	15,745	307,039
4	21	74	3	8	3	6,060	430,287	352	24,992	9⅗	680	31	21,245	2,400	170,400	85,685	13,275	942,531
Additional Sidings and Crossings, Turnplates, &c., &c.								-	-	-	-	-	-	-	-	-	-	60,000
Printing, Stationery, and Minor Contingencies, at 5 per cent.									-	-	-	-	-		-	47,127	-	47,127
																132,812	14,784	1049,658
3	19	27	1	–	–	447	10,736	352	8,448	9½	228	50	11,400	2,400	57,600	13,688	6,274	150,571
Additional Sidings and Crossings, Turnplates, &c., &c.								-	-	-	-	-	-	-	-	-	-	20,000
Printing, Stationery, and Minor Contingencies, at 5 per cent.									-	-	-	-	-		-	7,528	-	7,528
																21,216	7,417	178,099
4	17	17	1	–	–	352	9,328	352	9,328	7¾	205	30	6,150	2,400	63,600	11,115	4,614	122,269
Additional Sidings and Crossings, Turnplates, &c., &c.								-	-	-	-	-	-	-	-	-	-	20,000
Printing, Stationery, and Minor Contingencies, at 5 per cent.									-	-	-	-	-		-	6,113	-	6,113
																17,228	5,599	148,382
14	137	255	19	–	–	489	102,510	356	74,536	9¼	1,916	60	114,406	3,257	682,300	140,939	7,400	1,550,334
	-	-	-	-	-	-	-	-	-		-	-	-	-	-	218,454	8,844	1,852,849
21	169	397	20	1	–	687	156,568	359	81,972	9½	2,166	69	149,958	3,203	730,200	167,505	8,081	1,842,559
	-	-	-	-	-	-	-	-	-		-	-	-	-	-	256,613	9,501	2,166,167
26	206	354	25	4	–	650	187,113	358	103,092	9$\frac{3}{10}$	2,679	64	171,508	3,035	874,200	198,850	7,595	2,187,346
	-	-	-	-	-	-	-	-	-		-	-	-	-	-	305,195	9,006	2,593,695
27	227	591	28	8	3	1,684	601,621	354	126,544	9⅓	3,341	53	178,191	2,902	1,036,900	279,045	8,392	3,069,491
30	227	605	28	8	3	1,719	617,400	357	128,084	9⅓	3,359	57	192,753	2,910	1,044,600	284,535	8,718	3,129,880
	-	-	-	-	-	-	-	-	-		-	-	-	-	-	438,007	10,149	3,643,353

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[d] The Railway, though elevated, and with land for four lines, is chiefly within retaining walls, which accounts for the small quantity of land required.

[e] Comprising land for four lines of Railway, including the usual space for slopes and fences.

Appendix A. No. 1.

Report on the South and South-western Lines of Railway.

In order to illustrate the advantages of the principle of forming Main Trunk lines of Railway through the country, adopted for the general benefit, convenience, and improvement of the various districts pervaded by such lines and their principal branches, without making sacrifices or injurious deviations for the accommodation of any particular towns, I have drawn up the following table, which will be found to comprise every market town in the south and south-western districts. It will be evident that the time gained will be in proportion to the proximity of the Railways to the several places, and to their present distances from Dublin. But even the towns on the south-east coast will reap a portion of the advantage; the travellers gaining in time, although having a more circuitous route.

TABLE OF

Table of Distances.

TABLE of the principal Places in the SOUTH and SOUTH-WESTERN DISTRICTS OF IRELAND, which the through, be near to, or within an available distance of; with the computed COMPARATIVE DISTANCES and TIME Travelling from LONDON, by the London and Birmingham Railway, now nearly completed, and by the Grand about 260 miles, and across Channel to Dublin, and forward through the country.

The Rate of Railway Travelling by the First Class Trains, computed at 24 Miles an hour. The Channel Passage, with Miles per hour; the Distances being taken from Arrowsmith's Map of Ireland, and the Maps attached to this Report.

Increase the Distances in the 7th Column, two Miles; or three Miles, if the measurement is wanted to the General Post as per Note at the

PRINCIPAL PLACES.		Present Distances to and from Dublin.	FUTURE DISTANCES.				Present Time of Travelling to and from Dublin.		Future Time of Travelling to and from Dublin.		Time gained by Travelling along the proposed Routes through Ireland.		Future Time of Travelling to and from London.	
Names.	County.		By Lateral Roads to join the Railway.	Line of Railway on which the Lateral Road terminates, or the Town is situate.	Nearest remarkable Place where the Junction is made.	By Railway from the Junction to and from Dublin.								
		Miles.	Miles.			Miles.	H.	M.	H.	M.	H.	M.	H.	M.
Abbeyfeale	Limerick	157	24	Shannon Line	Near Askeaton	142	17	27	8	35	8	52	25	35
Abbeyleix	Queen's	61	0	Kilkenny Line	—	60	6	47	2	30	4	17	18	30
Adare	Limerick	130	5	Shannon Line	—	131	14	27	6	0	8	27	22	0
Ardfinnan	Tipperary	113	6	Cork Line	Near Cahir	108	12	33	5	10	7	23	21	10
Askeaton	Limerick	140	0	Shannon Line	—	142	15	33	5	35	9	38	21	55
Athy	Kildare	41	16	Main Trunk	Near Miltown	26	4	33	2	52	1	41	18	52
Ballyporeen	Tipperary	121	2	Cork Line	—	119	13	27	5	10	8	17	21	10
Ballyragget	Kilkenny	63	0	Kilkenny Line	—	69	7	0	2	52	4	8	18	52
Ballyroan	Queen's	57	2	Ditto	Near Corbally	57	6	20	2	35	3	45	18	35
Baltimore	Cork	215	37	Berehaven Line	—	175	23	53	11	24	11	29	27	24
Baltinglass	Wicklow	37	25	Main Trunk	Near Naas	17	4	7	3	29	0	38	19	29
Bandon	Cork	173	8	Berehaven Line	—	168	19	13	7	53	11	20	23	53
Bantry	Cork	208	5	Ditto	Near Coomboola	207	23	7	9	10	13	57	25	10
Berehaven	Cork	234	0	Ditto	—	231	26	0	9	37	16	23	25	37
Birr	King's	84	26	Main Trunk	Near Maryboro'	51	9	7	5	0	4	7	21	0
Blarney	Cork	160	0	Cork Line	—	161	17	47	6	42	11	5	22	42
Borros-in-Ossory	Queen's	68	3	Main Trunk	—	63	7	33	2	57	4	36	18	57
Buttevant	Cork	147	11	Cork Line	At Owbeg River	137	16	20	6	55	9	25	22	55
Cahir	Tipperary	109	1	Ditto	—	108	12	7	4	37	7	30	20	37
Cahirconlish	Limerick	124	2	Shannon Line	—	117	15	37	5	29	10	8	21	29
Callen	Kilkenny	83	10	Kilkenny Line	At Kilkenny	79	9	13	4	24	4	49	20	24
Carlow	Carlow	50	30	Main Trunk	Near Naas	17	5	33	4	2	1	31	20	2
Carrick-on-Suir	Tipperary	95	22	Kilkenny Line	At Kilkenny	79	10	33	5	52	4	41	21	52
Cashel	Tipperary	97	0	Cork Line	—	98	10	47	4	5	6	42	20	5
Castlecomer	Kilkenny	57	6	Kilkenny Line	At Branra Gate	64	6	20	3	20	3	0	19	20
Castle-Island	Kerry	170	37	Shannon Line	Near Askeaton	142	18	53	10	2	8	51	26	2
Castlemaine	Kerry	192	38	Ditto	At Tarbert	159	21	20	10	50	10	30	26	50
Castletown	Queen's	61	2	Main Trunk	—	59	6	37	2	40	3	57	18	40
Castletown-roche	Cork	144	2	Cork Line	At Owbeg River	137	16	0	5	55	10	5	21	55
Charleville	Cork	137	27	Shannon Line	—	112	15	13	7	40	7	33	23	40
Clogheen	Tipperary	116	5	Cork Line	—	115	12	53	5	20	7	33	21	20
CLONMEL	Tipperary	104	0	Lim. & Wat. Line	—	115	11	33	4	47	6	46	20	47
CORK	Cork	156	0	Cork Line	—	166	17	20	6	55	10	25	22	55
Dingle	Kerry	209	58	Shannon Line	At Tarbert	159	23	13	13	4	10	9	29	4
Doneraile	Cork	142	5	Cork Line	At Owbeg River	137	15	47	6	15	9	32	22	15
Dundrum	Tipperary	103	0	Shannon Line	—	98	11	27	4	5	7	22	20	5
Dungarvan	Waterford	119	23	Lim. & Wat. Line	At Clonmel	115	13	13	7	25	5	48	23	25
Edenderry	King's	37	11	Main Trunk	Near Rathangan	31	4	7	2	30	1	37	18	30
Ennis	Clare	140	24	Shannon Line	At Limerick	126	15	33	7	55	7	38	23	55
Enniscorthy	Wexford	76	35	Kilkenny Line	At Kilkenny	79	8	27	7	10	1	7	23	10
Fermoy	Cork	135	12	Cork Line	Nr. Mitchelstown	126	15	0	6	35	8	25	22	35
Fethard	Tipperary	99	9	Ditto	At Cashel	108	11	0	5	30	5	30	21	30
Freshford	Kilkenny	69	3	Kilkenny Line	—	72	7	40	3	20	4	20	19	20
Glengarriff	Cork	214	0	Berehaven Line	—	212	23	47	8	50	14	57	24	50
Glin	Limerick	154	0	Shannon Line	—	156	17	7	6	30	10	37	22	30
Golden Bridge	Tipperary	102	4	Cork Line	At Cashel	98	11	20	4	32	6	48	20	32
Holycross	Tipperary	91	1	Main Trunk	—	89	10	7	3	49	6	18	19	49

NOTE.—In the 7th Column of the above Table (Future Distances by Railway), the measurements being from Inchicore Avenue, purpose of making an accurate comparison of the Railway Distances, with the Present Distances from Dublin, by the Mail Routes that being the distance from Inchicore Avenue to the Post Office. And calling the additional Railway Distance, in round numbers, five Minutes from the "Time Gained," in the 10th Columns.

Appendix A.
No. 1.

Report on the South and South-western Lines of Railway.

route to pass. To Waterford, for instance, nearly four hours will be saved; and who can doubt that until a direct Railway be established between Dublin and Waterford, all the travelling between those places will be *viâ* Maryborough and Kilkenny; and though Wexford and Enniscorthy only gain an hour, and the generality of travelling will continue on the present roads, there may be many cases in which this hour would be of importance.

As I have furnished the Commissioners with a Report on the various routes by which a Railway communication might be made between London and Dublin, I have thought it might be interesting to add the future time of travelling between London and the places in the table.

DISTANCES.

Table of Distances.

several Lines of Railway Communications, as laid out under the direction of the COMMISSIONERS, will pass of TRAVELLING to and from DUBLIN, by the existing and proposed Routes; and also the computed Time of Junction Railway now open, and by the proposed Railway through North Wales to PORTH-DYNLLAEN, in all

improved and powerful Iron Steam-Boats, calculated at 12 Miles per hour. The Rate of Road Travelling in Ireland averaged at 9
The computed Time of Travelling between LONDON and DUBLIN by the above described Route, is assumed to be 16 Hours.

Office. Add Five Minutes to the time in the 9th and 11th Columns, and deduct Five Minutes from the Time in the 10th Column, foot of the Table.

PRINCIPAL PLACES.		Present Distances to and from Dublin.	FUTURE DISTANCES.				Present Time of Travelling to and from Dublin.		Future Time of Travelling to and from Dublin.		Time gained by Travelling along the proposed Routes through Ireland.		Future Time of Travelling to and from London.	
Names.	County.		By Lateral Roads to join the Railway.	Line of Railway on which the Lateral Road terminates, or the Town is situate.	Nearest remarkable Place where the Junction is made.	By Railway from the Junction to and from Dublin.								
		Miles.	Miles.			Miles	H.	M.	H.	M.	H.	M.	H.	M
Inchygeelagh	Cork	186	0	Berehaven Line	—	188	20	40	7	50	12	50	25	50
Kanturk	Cork	156	18	Cork Line	At Owbeg River	137	17	20	7	42	9	38	23	42
Kenmare	Kerry	197	40	Berehaven Line	Near Macroom	180	21	53	11	57	9	56	27	57
Kildare	Kildare	32	5	Main Trunk	At Miltown	26	3	33	1	38	1	38	17	38
Kildorery	Cork	134	0	Cork Line	—	133	14	33	5	32	9	21	27	32
KILKENNY	Kilkenny	73	0	Kilkenny Line	—	79	8	7	3	17	4	50	19	17
Killaloe	Clare	110	30	Main Trunk	Near Thurles	86	12	13	6	55	5	18	22	55
Killarney	Kerry	183	40	Cork Line	At Mallow	145	20	20	10	19	9	51	26	29
Kilenaule	Tipperary	92	24	Kilkenny Line	At Ballyragget	69	10	13	8	32	4	41	21	32
Kilrush	Clare	177	9	Shan. Line by water	At Tarbert	159	19	40	7	37	12	3	23	37
Kinsale	Cork	171	15	Cork Line	At Cork	166	19	0	8	35	10	25	24	35
LIMERICK	Limerick	120	0	Shannon Line	—	126	13	20	5	15	8	5	21	15
Lismore	Waterford	128	18	Cork Line	Near Cahir	108	14	13	6	30	7	43	22	30
Listowell	Kerry	167	12	Shannon Line	At Tarbert	159	18	33	7	57	10	36	23	57
Macroom	Cork	180	2	Berehaven Line	—	180	20	0	7	43	12	17	23	43
Maollw	Cork	149	0	Cork Line	—	145	15	27	6	2	9	25	22	2
Maryborough	Queen's	51	2	Main Trunk	—	50	5	40	2	18	3	22	18	18
Middleton	Cork	153	15	Cork Line	At Cork	166	17	0	8	35	8	25	24	35
Mill-street	Cork	171	22	Ditto	At Mallow	145	19	0	8	29	10	31	24	29
Mitchelstown	Cork	129	1	Ditto	—	126	14	20	5	22	8	58	21	22
Monastereven	Kildare	38	3	Main Trunk	—	35	4	13	1	27	2	46	17	27
Montrath	Queen's	59	2	Ditto	—	57	6	33	2	35	3	58	18	35
Mountmellick	Queen's	54	3	Ditto	Near Emo	46	6	0	2	15	3	45	18	15
Naas	Kildare	20	3	Ditto	At Bodenstown	17	2	13	1	2	1	11	17	2
Nenagh	Tipperary	96	20	Ditto	Near Thurles	86	10	40	5	48	4	52	21	48
New Ross	Wexford	84	27	Kilkenny Line	At Kilkenny	79	9	20	6	16	3	4	22	16
Philipstown	King's	49	15	Main Trunk	Near Rathangan	31	5	27	2	57	2	30	18	57
Portarlington	King's	47	2	Ditto	At Spire Hill	41	5	13	1	55	3	18	17	55
Rathangan	Kildare	36	1	Ditto	—	31	4	0	1	23	2	37	17	23
Rathcormuck	Cork	140	16	Cork Line	At Mitchelstown	126	14	27	7	2	7	25	23	2
Rathdowney	Queen's	75	4	Main Trunk	—	66	8	20	3	12	5	8	19	12
Roscrea	Tipperary	175	8	Ditto	—	69	19	27	3	45	15	42	19	45
Rosscarbery	Cork	192	25	Berehaven Line	—	168	21	20	9	47	11	33	25	47
Shanagolden	Limerick	145	5	Shannon Line	Near Askeaton	142	16	7	6	28	9	39	22	28
Stradbally	Queen's	49	7	Main Trunk	—	46	5	27	2	42	2	45	18	42
Tarbert	Kerry	158	0	Shannon Line	—	159	17	33	6	37	10	56	22	37
Templemore	Tipperary	88	3	Main Trunk	—	77	9	47	3	32	6	15	19	32
Tipperary	Tipperary	110	5	Shannon Line	Near Donaghill	103	12	13	4	50	7	23	20	50
Thomastown	Kilkenny	75	12	Kilkenny Line	At Kilkenny	79	8	20	4	37	3	43	20	37
Thurles	Tipperary	88	1	Main Trunk	—	86	9	47	3	42	6	5	19	42
Tralee	Kerry	182	30	Shannon Line	At Tarbert	159	20	13	9	57	10	16	25	57
Tullamore	King's	59	13	Main Trunk	Near Emo	46	6	33	3	17	3	16	19	17
Urlingford	Kilkenny	78	13	Kilkenny Line	At Branra Gate	64	8	40	4	7	4	33	20	7
Valentia	Kerry	220	60	Shannon Line	At Tarbert	159	24	27	13	17	11	10	29	17
WATERFORD	Waterford	94	30	Kilkenny Line	At Kilkenny	79	10	27	0	37	3	50	22	37
WEXFORD	Wexford	85	45	Ditto	At Kilkenny	79	9	27	8	17	1	10	24	17
Youghall	Cork	139	36	Cork Line	Near Cahir	108	15	27	8	30	6	57	24	30

1¾ miles must be added for the distance from that point to the General Terminus in Dublin, at Barrack-bridge; and, for the (which are all measured from the General Post Office), to the distances in the 7th Column, there should be added three miles; two miles, there must be made an addition of five minutes to the "Future Time," in the 9th and 11th Columns, and a deduction of

Appendix A. No. 1.

Report on the South and South-western Lines of Railway.

Other Lines Surveyed.

OTHER LINES SURVEYED.

In addition to the lines of Railway before described, as laid out or reported upon, under the direction of the Commissioners, I have been requested to lay before them Plans, Sections, and Reports of the following Railways, which I have surveyed as Engineer of the respective Companies or Committees proposing to establish such lines, viz.:—

1. Cork and Passage Railway.

1. The Cork and Passage Railway, a distance of little more than six miles; the Act for which has been obtained, and steps are now taking to commence operations as early as possible. This line, in construction, traffic, and returns, will greatly resemble the Dublin and Kingstown Railway.

The intention of this line is to connect Cork with the lower estuary of the River Lee, which forms the Cove of Cork. A new quay has been constructed at the town of Passage, which is used by the mercantile steamers. Abreast of this quay is deep water and safe anchorage, which, I am informed, is not the case off Cove. In boisterous weather, passengers can land and embark from the Passage quays with great facility: the formation of the Railway will render them, practically, part of the City of Cork; and the delays in arrival and departure, from tides, will be obviated.

2. Kingstown and Bray Railway.

2. The Kingstown and Bray Railway, which is intended to be a continuation of the Dublin and Kingstown Railway, through Bullock and Dalkey, and round the face of the Killiney cliffs, and thence along the coast to Bray, where it will terminate, so directed as to be further continued round Bray Head to the port of Wicklow; a continuation quite practicable, with favourable levels, and at a moderate expense.

This line would be of much local advantage to the very populous neighbourhood, which is daily increasing, between Kingstown and Dalkey; extending to them the many conveniences which the Dublin and Kingstown Railway has proved to afford. An extension would also be offered the citizens of Dublin of the facilities of access to the sea; and to the suburban residences, now continually springing up in the district proposed to be opened. A direct connexion would also be made with the inexhaustible granite quarries at Bullock, Dalkey, and Killiney, affording a better and cheaper supply for the completion of the Government works at the Royal Harbour, and enabling the present tram road to be dispensed with, and opening a way for a constant delivery of this fine material for the buildings of Dublin, and for shipment to England: and also affording facilities of access to the valuable mines of the county of Wicklow.

3. Cork and Limerick Railway.

3. The Cork and Limerick Railway. This line was projected before the Commissioners had commenced their inquiries. Now, that one of their Railway lines will occupy the best ground between Limerick and Mallow, I have no doubt the parties promoting the original line will be content to start from off the Cork Line, at or near the latter town, continuing the route either by Doneraile, or by Ballyclough to Buttevant, and thence by Charleville and Bruree to Limerick, so soon as the views of the Commissioners are made public; and it will be my recommendation to them to do so.

To connect Cork and Limerick by Railway, has long been greatly desired; and several years since, Mr. Griffith, (one of your Honorable Board) took very extensive surveys and levels for that purpose. I have not been able to find any general course differing from that determined by Mr. Griffith; though the principle on which my sections are graduated are different; being the result of the experience of the system of working Railways extensively, for goods and passengers, by locomotive engines; a system which had not been tried at that time. The line of Mr. Griffith's proceeded from Mallow, by Ballyclough, to Doneraile and Velvetstown, which I have also surveyed; and, in addition, another route by Doneraile, which, though shorter, would require an expensive tunnel, and in general would perhaps be more costly, but it would interfere less with residence property, in getting out of Mallow. I am not yet prepared to decide between these lines, but am inclined at present to consider the course should be by Ballyclough. The Cork and Limerick Railway in connexion with the lines laid out by your Commission, would be of great advantage to the agricultural and rural district of the counties of Cork and Limerick, connecting some of their chief towns with the respective shipping ports, and also with Dublin. The most expensive part of the line from Cork to Mallow, being necessarily formed as part of the main line from the metropolis, will render the completion of the remainder much easier; and by adopting gradients suited to the extent of traffic, and laying down, in the first instance, a single line of Railway, the time and cost of contract may be brought within a very moderate extent.

4. Great Central Irish Railway.

4. The Great Central Irish Railway.—The project for this line originated two or three years ago, previous to the issue of your Commission. In 1836, surveys were made and Parliamentary documents lodged, under the direction of a most respectable body of Directors, but the petition for a bill was unsuccessful, from some informalities. The application is renewed in the present session, but to avoid interfering either with the Great Leinster and Munster (Dublin and Kilkenny) Railway, or with the plans of your Commission, the line now commences on Celbridge Commons, instead of from Dublin, leaving the junction to be hereafter determined, as well as the terms on which the traffic shall be conveyed.

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Report on the South and South-western Lines of Railway.

Great Central Irish Railway.

From Celbridge the main line of the Great Central Railway, will proceed direct to Kilcock, passing south of Maynooth: from Kilcock the course is west, between Kinnegad and Killucan, to the northern outskirts of Mullingar, a distance of about 40 miles from Celbridge. The application to Parliament is at present limited to a terminus at Mullingar; but three important extensions are prepared, and the necessary plans, sections, &c., have been lodged to authorize a further renewal in the next session (1839).

The first of these will be the extension of the main line from Mullingar, along the west side of lake Ennel to Castletown, and keeping north of Moate, terminating about 30 miles from Mullingar, at Athlone, leaving the further continuation by Ballinasloe and Athenry, to Galway, for a future period.

The second extension will branch from the main line near Killucan, and proceed by Multyfarnham and Edgeworthstown, to Longford, a distance of nearly 40 miles, where the present survey terminates; but levels have been taken, which demonstrate that a very favorable line may be pushed on hereafter, by Carrick-on-Shannon and Boyle, to Ballisadare and Sligo.

The third branch is from the vicinity of Kilcock, by Trim, to Kells, 20 miles, making Kells, by this route, 44½ miles from the General Post Office in Dublin.

The line from Celbridge to Mullingar is particularly favourable, and the branch from Kilcock to Kells still more so, not exceeding £8000 or £9000 per mile. The other lines to Athlone and Longford, though having to encounter a greater amount of excavations, &c., are still, comparatively, easy lines.

GENERAL OBSERVATIONS ON THE LINES OF RAILWAYS.

General Observations

As general observations, applicable to the whole of the lines laid out under the direction of the Commissioners, through the South and South-western districts, as well as to the other lines surveyed, as just enumerated, they may, with the few exceptions particularly mentioned, be characterized as of remarkable facility of execution, and as having very favourable curves and levels.

Through an extent of nearly 360 miles of lines laid out, for the Commissioners, the amount of tunnelling is barely two miles, and, on a comparison of many of the sections with those of the principal English Railways, as executed or in progress, the smaller amount of earth-work will be manifest, though some of the very heavy portions of the lines make the averages, in the Abstract of Estimates, appear high.

The long list of important towns embraced within the range of the various lines, especially of the main trunk, amply bears out the correctness of the principles on which the instructions for laying out the Railways were made out.

While approaching the principal places, as near as practicable, there is scarcely any interference with houses, villages, town property, or valuable building land. Mallow is the sole exception, and the ground taken would be but for the piers of the bridge or viaduct across the town.

Neither are any of the existing canals, or navigable rivers, affected.

No road, of any traffic, will be crossed on the level. Indeed, for all public roads, bridges have been provided in the estimates.

Nowhere, except for the Entrance into Dublin, will the lines interfere materially with any residence property of importance, nor in any one place that I can remember, or have had pointed out to me, injuriously so: the lines, for the most part, pass over lands of comparatively little worth, and, in many places, of no value at all, particularly in the bog districts, and in the western parts of the county of Cork.

Traversing, almost universally, through the limestone country, the materials for drains and for the bed of the Railway, for bridges, and for fencing, will be abundant and cheap; and where the heaviest construction will be required, the supply is most plentiful.

It is conceived, also, that, except for the streams and public roads, but few bridges will be requisite; and, as regards the water-ways, no arches but those of ordinary dimensions will be necessary.

The manifest improvement which the Railway lines will bring to all the properties it may approach, induces a hope and expectation that the many heavy items for contingencies and damages, arising on the construction of Railways in Great Britain, may be avoided, when the lines now laid out through Ireland, shall be put into execution.

I have the honor to be, Gentlemen, your very obedient humble Servant,

CHARLES VIGNOLES, *Civil Engineer*.

4, TRAFALGAR SQUARE, LONDON, *March*, 1838.

APPENDIX A.

No. 2.

REPORT

On the mode by which it is practicable to extend the Railways, laid out under the direction of the Commissioners, having a general Terminus at Barrack-Bridge, through Dublin, along the Quays of the Liffey, to unite with the Railway terminating at Westland-Row, and connecting with the Royal Harbour of George IV. at Kingstown;

By CHARLES VIGNOLES, CIVIL ENGINEER, F.R.A.S., M.R.I.A., M. Inst. C. E.

Appendix A.
No. 2.

Report on the practicability of extending the Lines of Railway through Dublin.

To the Commissioners for Inquiring into the Best System of Railway Communications through Ireland.

Gentlemen,—The proposition for approaching Dublin, along the Valley of the Liffey, with the Main Trunk Lines of Railway, from the South and South-western Districts, having been favorably entertained, the extension of the general terminus from the point first contemplated, at Island-bridge road, became a necessary consequence. The open unimproved grounds from thence to the head of the river quays presenting such facilities of approach as to determine, without reference to any ulterior objects, that it would be most highly desirable at once to fix the general terminating station at or near Barrack-bridge, or on the ground westward thereof, towards King's-bridge, lying between the river Liffey and the Military Road.

This mode of entering into Dublin is discussed in the Report I have prepared for the Commissioners, in pursuance of their official instructions; but a still further extension of the Railway is practicable, and though I have not any directions to report thereon, I trust the Commissioners will permit me to lay before them the following remarks relative to a project which, even if not coming within the range of their present inquiry, should, in my humble judgment, be closely kept in view, as likely, at no very distant period, to be seriously entertained, on the score of public convenience and utility.

This extension consists in passing, at a sufficient elevation, by means of a light iron Colonnade Viaduct, between the quays and the Liffey, along the right bank of that river, in the manner distinctly shown on the accompanying detailed Plan of part of the City of Dublin, and by the annexed geometrical drawings, and further illustrated by some perspective views* of the proposed construction, and by an outline plan of the City, which I have the honor of presenting to the Commissioners.

Were nothing more to be gained than penetrating into the centre of Dublin, I should not conceive the result of sufficient importance to justify the adoption of this plan; but the object I would attain is of a higher kind.

Dublin and Kingstown Railway.

The Railway which connects Kingstown Harbour and the great packet station for England with Dublin, terminates at Westland-row, on the east side of the city, and the interval from Barrack-bridge is only one mile and a half, of which scarcely one-eighth part will pass through buildings.

So far, therefore, as regards the destruction of property, the plan is the least objectionable; and if in other respects, it can be rendered not unsightly, but rather ornamental; not interfering with the traffic, while conducing in some respects to the salubrity of the city; avoiding all interference with private rights or privileges, and not obstructing the view, or producing discomfort to the parties in whose vicinity it may pass; I hope I may be allowed to urge that the public advantages in all other respects will be extremely great, provided the same can be attained, as I hope to demonstrate, by a comparatively small expenditure.

General Elevation 20 feet above the Streets and Quays.

The proposed height of the terminus of the Railways at Barrack-bridge will probably be about 23 feet, and the average elevation of the rails of the Viaduct over the other bridges, and such streets as are to be crossed, will be about 20 feet, thus giving ample headway for all vehicles passing below, after providing proper depth for the beams carrying the lines of Railway across the respective thoroughfares.

On reference to the drawings, it will be seen that it is proposed to erect a colonnade of Grecian Architecture of the Ionic order, the intercolumniations measuring 30 feet from centre to centre, the entablature forming a close parapet for the Railway. The uniformity of the elevation might be broken by placing the columns in pairs on each side of, and giving a greater opening for the streets and bridges, where crossed. From Barrack-bridge to Aston's-quay, near Carlisle-bridge, one range of columns would be placed on the curbing of the foot path which runs along the parapet wall of the quays, the other range would spring from a surbase, to be constructed in the river, advanced into the same about 20 feet. Up to the level of high water neap tides, I propose to make this surbase continuous and water tight, so as to form a lateral channel about 16 feet in breadth, to serve as a receptacle for the sullage at present discharged from numerous sewers into the Liffey, constituting, in summer and dry seasons, a noxious deposit, greatly complained of when the retiring tide leaves the sides uncovered with water, and which it has long been the object of the municipal authorities to obviate. The sullage thus received would pass down this lateral channel to below Carlisle-bridge, where the ebb seldom or ever leaves bare the sides of the river.

Above the neap tide level, and from the coping of the surbase, the pedestals of the columns would spring, leaving the whole present breadth of the river for the flow of the spring tides and the free passage of flood waters, which, in their rapid ebb through the lateral channel, would periodically cleanse it from any over accumulations of the sullage; while, by means of a sluice, at the end of the side channel, below Carlisle-Bridge, the water may be always retained therein at the level of high

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* Only the Outline Plan of the City and the Geometrical Drawings of the Viaduct are printed.

Appendix A.
No. 2.

Report on the practicability of extending the Lines of Railway through Dublin.

water neap tides, or such other level as would cover the discharging mouths of the sewers, or be sufficiently above the deposited sullage.*

The advantages of this lateral sewerage, it is conceived, would be a sufficient boon to the city for the privilege or right of way to construct the Railway along the quays.

In regard to individual rights, the access to and use of the quays and river would remain precisely as at present; the architecture of the Viaduct would scarcely be deemed an unsightly object, and would not injure the view from any of the houses. From the lower floors the eye ranging through the spacious intercolumniations, could take in all now seen; and from the upper floors would overlook the parapet, which would be no more than an ornament of seven or eight feet in height, stretching horizontally, elevated 20 feet from the ground, and at an average distance from the windows of about 50 feet.

The mode in which the traffic of the Railway should be carried on, must be by horse power, or by endless ropes; one, if necessary, for each of the two lines, to be worked by stationary engines, with furnaces constructed, if required, to consume their own smoke, and placed in convenient situations at each extremity of the viaduct. The only visible movement from the upper windows would then be that of single vehicles or trains of carriages, gliding almost noiselessly over the Colonnade, at such degree of velocity as public or private convenience might assign; and from the lower rooms and streets scarcely more than the upper part of the carriages would be seen.

The under part of the viaduct to be flagged over joists, and either thrown open as a public promenade, or reserved for such purposes as may be arranged with the local authorities.

The Colonnade Viaduct, thus constructed, would pass along the south side of the Liffey to the west end of Aston's-quay, which would be crossed obliquely; then pass through the block of buildings between Price-lane and Westmoreland-street, the latter being crossed nearly at right angles; D'Olier-street would be passed on the skew, and the Viaduct carried close on the south of the Dublin Library House, through the adjacent vacant ground; passing Hawkins'-street, it would go through some timber yards near the theatre, and then over Townsend-street and a few small tenements, to Great Brunswick-street, crossing the same obliquely; and just missing Clarendon's Riding School, will occupy the site of the Adelphi Minor Theatre, and take the rere of some of the other houses; then cross the Stable-lane to the north wall of the College Gardens, along which the Colonnade would run to the east end of the Garden, and passing the premises occupied as a Model School for Infant Tuition, cross Westland-row into the Station of the Kingstown Railway.

The crossing of the several streets may be rendered wholly unobjectionable, by increasing the openings between the columns and varying the mode of constructing the Viaduct, still preserving its architectural harmony, so as to leave carriage and foot-ways of the streets to their full present openings, even when crossed most obliquely and where the breadth is greatest. For these the principle of trussing the beams usually adopted would be altered, giving increased stability on account of the greater span, and advantage taken of it to introduce elevations of suitable character.

The number of houses to be actually taken down, or materially injured, is only thirty-seven, and but few of these are of great value. In fact, the only actual interference with any vested rights would be in passing for little more than 200 yards along the north wall of the College Park; but I must respectfully represent, that the present wall remaining undisturbed, or strengthened, and, if needful, rebuilt, and the Colonnade being constructed to harmonize with the buildings of the College, no change would be made, no innovation attempted, and no injury done, as there would be simply formed, on one side of the garden wall, a covered walk 30 feet wide and a furlong in length, which, being paved with granite flagging, would afford, in winter, a warm, dry promenade; and in summer a cool retreat for the Professors and Students; and from whom not one inch of property would be taken; and I should conceive, when the design is properly explained to them, and that it be arranged the erection should be made under the direction and superintendence of their officers, the authorities of Trinity College would not interpose to stop a public work of this importance.

In calculating the cost of the work I have had the great advantage of the assistance of one of the most able and experienced architects and builders in Dublin; and, for greater satisfaction, I subjoin the detail of the

ESTIMATE FOR THE IRON COLONNADE VIADUCT, EXTENDING THE RAILWAYS THROUGH DUBLIN.

Estimates.

1. Details for a length of 10 yards of the Surbase and Superstructure, viz.,

Surbase.

	£	s.	d.
Rough basement or surbase wall for supporting iron columns, 30 feet apart, and for forming a lateral channel or conduit to retain the tidal water, so as to cover the mouths of the sewers and deposited sullage, 82 cubic yards, at 18*s.*, - -	73	16	0
Clearing foundations and puddling, 10 lineal yards, at 5*s.*, - - -	2	10	0
Rustic base to pedestals of columns, 75 cubic feet, at 1*s.* 6*d.*, - - -	5	12	6
Pedestal of column, 112 cubic feet, at 2*s.* 6*d.*, - - - - -	14	0	0
Iron beam and breastsummer to river front, 30 cwt., - - - -	18	0	0
Joists for flagging, - - - - - - - -	7	17	6
Granite or Valentia slate flagging, 600 superficial feet, at 1*s.*, - - -	30	0	0
	£151	16	0

Being for 10 lineal yards of surbase, £15 per yard.

Superstructure.

	£	s.	d.
Columns and entablature in a length of 30 feet, 10 tons 16 cwt., at £12 -	129	12	0
Beams in road pieces and in lintels along parapet, also transversely from pillar to pillar; 5 whole baulks and 2 half baulks, say six beams, including trussing with $1\frac{1}{2}$ inch wrought iron, and fixing complete at £9 each, - - - -	54	0	0
Planking roadway 900 superficial feet at 1*s.* - - - - -	45	0	0
Counter-planking the Horse paths with elm, 270 superficial feet at 9*d.* - -	10	2	6
Foundations and basement to columns on land, two columns to each bay, -	1	11	0
	£240	5	6

Being for 10 lineal yards of superstructure, £24 per yard.

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* A slight dam above Barrack-bridge would form a reservoir at the top end of the sewer, and afford means of scouring the same daily, if needful. A few thousand pounds additional would arch over this lateral channel, but I submit that such is not only unnecessary but would rather diminish than increase the good effect; nor with the continual cleansing could any effluvia be accumulated.

Abstract of the Estimates.

2. Abstract of Estimates.

	£	s.	d.
Along the river sides and quays, 1847 yards, as per preceding detailed estimate, at £39 per lineal yard, - - - - - - -	72,033	0	0
Crossings over streets 268 yards, through buildings, &c., 392 yards = 660 yards as per preceding detailed estimate, at £24 per lineal yard, - - -	15,840	0	0
Along north wall of College Park, allowing for the omission of one range of columns and entablature, and one trussed beam, and providing flagging below colonnade, 231 yards at £20 per lineal yard, - - - - - -	4,620	0	0
Continuation of the substructure for the sewerage from Aston's-quay to below Carlisle-bridge, 143 yards at £8 per yard, - - - - -	1,144	0	0
Houses taken down or damaged, from Aston's-quay to Westland-row, including value of land actually occupied, and allowing for resales, 38 houses at £1000, -	38,000	0	0
2738 lineal yards of double track of Railway, 40 lbs. per yard for weight of single bar broad based, and having a continuous bearing on the longitudinal timbers, including laying complete, at 18*s*. per lineal yard, - - - - - -	2,464	4	0
	£134,101	4	0
Contingencies and Management, $12\frac{1}{2}$ per cent. - -	16,762	12	6
Total Cost.	£150,863	16	6

I consider the preceding statement bears out the assumption, that the Colonnade Viaduct for the Railway through Dublin, may be constructed with facility and economy, without any public or very material private inconvenience, with the smallest destruction of property, and at a reasonable cost; for it must be admitted, that to pass a Railway through the whole extent of the central part of Dublin, from east to west, for an expenditure of £150,000, is to effect that object at a very moderate rate.

Were this outlay to be provided for from a public fund, or to be executed under Government Commissioners, or were it to be undertaken by individuals who would be so far patronized as to obtain the Money on loans from the Board of Public Works, the actual sum requisite to repay the interest and provide a sinking fund, over and above the cost of maintenance, may be fairly taken at £6000 per annum; and we have therefore only to consider whether the objects to be attained, are worth the annual charge to the above amount.

I admit I am not able to reduce to absolute figures, the returns of revenue from the various sources which would be opened, but I do conceive

Probable Sources of future Revenue.

1st. That from the general convenience offered to the travelling public, a passenger toll, to a very large amount, would be obtainable.

2nd. That a direct communication from the Railway to establishments on its course through the city, such as to Home's Hotel,* or to Warehouses in that quarter of the town, would induce the proprietors of such to pay something for the privilege.

3rd. That the advantage of bringing cattle, sheep, pigs, corn, flour, and other agricultural produce from the interior of Ireland, direct to Kingstown Harbour, where they could be embarked without delay or expense, and avoiding the inconvenience of passing in detail through Dublin, would be found worth a moderate toll.

4th. That the removal of troops, stores, munitions, &c., for the Government, and particularly despatches and expresses, would be greatly facilitated; and in cases of emergency, so materially so, as to justify some returns from this source.

5th. That valuable light goods for the interior, and, probably at no distant period, for shipment at a seaport and packet station in the south-west of Ireland, would be another means of income.

6th. That when the Railway lines radiate, as they must ere long do, to many parts of Ireland, a very small additional contribution from lateral Railways falling on to the main trunk, and obtaining for their passengers and traders the convenience of access to the centre of Dublin, and a thoroughfare to Kingstown harbour, would bring an additional income.

7th. That no inconsiderable local traffic through Dublin itself may be anticipated.

8th. That from the Directors of the Dublin and Kingstown Railway some revenue may be expected, for the privilege of allowing them to bring their passengers up to Carlisle-bridge and its vicinity.

9th. That passengers for or from England, arriving from or proceeding to the interior, particularly when travelling with carriages, horses, &c., and not intended to stop in Dublin, would yield willingly an extra toll to avoid the inconvenience and vexation of delay; as would also the bearer of commercial expresses, more especially with intelligence to and from packets, when stationed at a south or south-western port, as will, undoubtedly, soon be the case; and

10th. From other sources, at present undeveloped and unthought of, which new and facile communications ever bring forward.

Probable Success of the Undertaking.

Other advantages to the public, not reducible to money, will be obtained; and, on the whole, I think I am justified in putting forward the project for this communication through Dublin, from the great probability of its success, both as a commercial speculation, and as a great auxiliary and last link in the chain of Railway communication which the Commissioners are entertaining, not only to open new channels through Ireland, but to perfect the connexion with Great Britain, and to reduce the transit from the Metropolis of the empire to its extreme western boundary, on the Atlantic, to a single twenty-four hours' journey.

I have the honour to be, Gentlemen, your very obedient Servant,

CHARLES VIGNOLES, *Civil Engineer*.

4, Trafalgar-square, London, *March*, 1838.

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* It might not be unadvisable to consider whether the general terminus of the Railways laid out by the Commissioners, at present fixed at Barrack-bridge, might not be pushed on along the quays to this place, which is well adapted for a station.

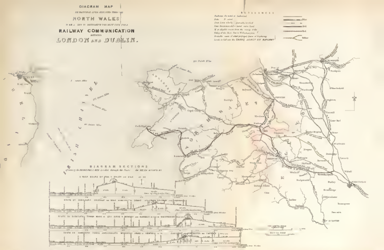

DIAGRAM MAP
NORTH WALES
RAILWAY COMMUNICATION
BETWEEN
LONDON AND DUBLIN.
REFERENCES
NORTH WALES
IRISH CHANNEL
ANGLESEY
DIAGRAM SECTIONS

APPENDIX A.

No. 3.

REPORT

ON THE

VARIOUS LINES BY WHICH A RAILWAY COULD BE CARRIED FROM LONDON TO PORTH-DYNLLAEN, IN NORTH WALES.

BY CHARLES VIGNOLES, CIVIL ENGINEER, F.R.A.S., M.R.I.A., M. INST. C. E.

Appendix A. No. 3.

Report on the various Lines by which a Railway could be carried from London to Porth-Dynllaen, in North Wales.

TO THE COMMISSIONERS FOR INQUIRING INTO THE BEST SYSTEM OF RAILWAY COMMUNICATIONS THROUGH IRELAND.

GENTLEMEN,—I have had the honour of receiving your directions, under date of the 31st March last, requesting me to furnish your Commission with a Report on the investigation I had previously made of the various lines by which a Railway could be carried from London to Porth-Dynllaen, in North Wales; accompanying my Report with a map showing the direction of each line examined, and a copy of the section of that line which, in my opinion is, under all circumstances, the most favourable for such description of communication; and to state my reasons for coming to that conclusion.

I am, at length, able to transmit my Report, as requested, which is accompanied by the following documents, viz.:—

1st. A General Map, drawn to a scale of $5\frac{1}{2}$ statute miles to an inch, extending from Liverpool and Manchester, on the north, to Worcester, on the south; and from Birmingham, on the east, westward through North Wales, and across the Irish channel, showing the eastern coast of Ireland between Dublin and Arklow; nearly the whole being compiled from the Ordnance Trigonometrical Surveys. On the face of this map appears a sketch of Porth-Dynllaen Bay, reduced from the Admiralty chart, constructed in the spring of the present year by Lieutenant Sheringham, R.N. The figured distances between the opposite ports in the Irish channel, were deduced from the great Triangulation of the United Kingdom, with the permission of Colonel Colby, by Lieutenant Larcom, R. E. This plate also contains diagram sections of some of the principal lines between Porth-Dynllaen and the plains of Shropshire and Worcestershire, through the various passes of the Welch mountains; and on the map are marked all the lines levelled and examined by me; as well as the course of all the Railways throughout the districts comprised in the map which are in operation, or in course of construction, or which have received the sanction of Parliament, as well as some other projected lines, adverted to in this Report.

2. Detailed Sections (in eight sheets) of the line which I have recommended for adoption; extending from Porth-Dynllaen Bay by Pwhelli, Tremadoc, Harlech, Barmouth, Dolgelly, and Drws-y-Nant to Bala, passing on the south side of the lake. The course from Bala forward being necessarily confined to the valley of the river Dee, as far as the vicinity of Chirk, the inquiries I had instituted were satisfied with that general result, and my detailed sections are not completed further, though levels have been taken to the Grand Junction Railway.

3. A Diagram Map and Sections on half the scale of the General Map, for the purpose of more easy reference to the principal points and features.

Before proceeding to discuss the relative merits of the several lines examined, I hope it will not be considered irrelevant if I give a cursory explanation of the manner in which the investigation of this subject commenced, and of the successive steps which were taken in the matter, up to the period when it appears to have attracted the attention of the Commissioners, and induced them to request the information which I have the honor of being permitted to lay before them; indeed, justice to the parties originating the affair suggests the propriety of a proper statement of all the circumstances.

The inquiry was first brought publicly forward in Dublin, at a preliminary meeting, on the 9th day of August, 1835, which was followed up by a most respectable and numerous assemblage of the leading and influential merchants and citizens of all professions, held at the Commercial Buildings, on the 22nd day of January, 1836, at which the Right Honorable the Lord Mayor of Dublin presided.

These meetings were called in consequence of the representations of Mr. Henry Archer, formerly of Dublin, but who, as managing Director of the Festiniog Railway, has latterly been resident in that part of North Wales which has been explored. This gentleman had previously paid much attention to the subject, and, with the assistance of one of the local engineers, had made some cursory surveys, directing his inquiries chiefly to the Pass of Carno, being, as he supposed, on the most direct route to London, by Newtown, Worcester, and Oxford.

Report on the various Lines by which a Railway could be carried from London to Porth-Dynllaen, in North Wales.

At the Dublin meeting in January, last year, a select Committee was appointed to communicate with His Excellency the Lord Lieutenant of Ireland, in order to draw the attention of Government to the importance of the projected measure, and also after more definite and detailed examination had been made, to prepare a Report, and to act with parties in London favourable to the measure. It was in consequence of an application from the two acting members of this Committee, deputed by the main body, that I engaged to have the necessary sections made, and to take a personal view of the line suggested; and Mr. Rastrick, of Birmingham, was united with me in this investigation, the necessary series of levels being conducted under my own immediate direction; and when the general results of our surveys had been deduced, so far as respected the first portion of the inquiry, Mr. Rastrick and myself made a joint Report to the Committee, concurring in recommending the line from Porth-Dynllaen by Barmouth and Bala, to fall into the Grand Junction Railway to the north of Wolverhampton. The Sub-Committee, however, did not rest satisfied with this Report, which extended only to the resolution of the inquiry, as to the best mode of approaching Porth-Dynllaen Bay from London, either by a south or by a central route; and, in consequence, I made further separate surveys, and had a series of levels taken from Chester, by Flint, Holywell, Abergele, Conway, Bangor, the Menai Bridge, and across the southern part of the Island of Anglesey to Holyhead; and subsequently from Bangor by Carnarvon and the foot of the Rivel mountains to Porth-Dynllaen; on both of which routes I made distinct Reports to the Committee.

Further Surveys made to Holyhead.

Chester and Ruabon.

It also occurred about the same period, that a number of the leading gentlemen in Chester and parts adjacent, including some principal merchants in Liverpool, formed themselves into a Committee for establishing a Railway between Chester and the Ruabon collieries, and the mineral districts of the eastern parts of Denbighshire.

Perceiving how such a Railway might be made to unite with the general line, in the vicinity of Llangollen, I drew to it the attention of the Dublin Sub-Committee, and, at their request, reported on the facilities it presented of communicating from the interior of Wales to Chester, Liverpool, and the North, in connexion with the great travelling line from London and Birmingham, to a Welch packet port.

In these two latter instances, viz., of an entirely north route to Porth-Dynllaen, or to Holyhead, and of the line from the Ruabon Collieries, Chester had been fixed upon as an important station. In the first case, on account of a proposed line from the Grand Junction Railway at Crewe to Chester, and of another from Chester to Birkenhead; both of which have since been incorporated by legislative enactments. And, in the second case, from the increasing demands for a proper supply of coal, to meet the wants of Chester and the south of Cheshire, and to connect that city, the great mart of the Welch, with the central valleys of North Wales.

Under the preceding circumstances, I had obtained considerable information on the subject of Railway lines through Wales; but after the receipt of the communication from your Commission, I felt it necessary to make some further general examinations of the route between Porth-Dynllaen and the Bala Pass, which had been selected by Mr. Rastrick and myself, in order to determine more definitely the principle of carrying the line from Barmouth to the summit; and, accordingly, I had some additional levels taken at several places, and the general points of the line from Porth-Dynllaen to Bala, and from Porth-Dynllaen to Bangor, were revisited.

The principal question to be resolved, after having determined the practicability of forming a Railway at all through North Wales, is the direction in which it should be carried, to fall into one or other of the great leading lines from London; first, whether the course should be entirely to the north from Holyhead, or from Porth-Dynllaen, by Bangor, Conway, Flint, and Chester, to unite with the Grand Junction Railway at Crewe; or, secondly, altogether to the south, from Porth-Dynllaen by Barmouth, Towyn, Carno, Newtown, Bishopscastle, Ludlow, Worcester, and Oxford, to join the Great Western Railway, or otherwise by the proposed Oxford and Tring Line, to fall into the London and Birmingham Railway at Tring; or, thirdly, whether some central route might not be adopted by Llanfair and Shrewsbury; or by Dolgelly, Bala, and the Valley of the Dee, to Wolverhampton, or to some eligible point on the Grand Junction Railway, north of that town.

The result of the exploring levels soon demonstrated, that from the peculiar features of North Wales, a direct course on any of the general lines was not to be had, without encountering gradients quite unsuited for high velocities, or the continuous transit of locomotive engines; and, as respects mere linear distance to London, there was but a difference of a few miles by either of those lines which were practicable.

Postponing for the present the consideration of the Railways wholly to the north, I may remark, that from Porth-Dynllaen to Tremadoc will be a common route for all the southern and central lines; and, except some difficulties while crossing the roots of Carn Bodeuan, a branch of the Rivel Mountains, the general features of the first 25 miles may be considered favourable. Could a direct line from Tremadoc to Bala have been found, 16 miles might have been saved in distance; but an additional elevation of 430 feet within a very few miles, and the necessity of adopting very steep planes for two miles in succession, involving a total rise in that short distance of upwards of 600 feet, rendered the selection of this direct line quite out of the question.

Direct Line from Bala to Tremadoc, impracticable.

It then became necessary to follow the Welch coast from Tremadoc to Barmouth, from which town I attempted to trace a direct route to Shrewsbury; but for Railway purposes

Report on the various Lines by which a Railway could be carried from London to Porth-Dynllean, in North Wales.

Tremadoc to Barmouth.

a line from Dolgelly to Dinasmowddy was found to be impracticable. This forced me to try the levels further along the coast, and at once the formidable obstacle of crossing the harbour of Barmouth presented itself; but, leaving the detail of this to be investigated afterwards, if necessary, and supposing the nautical objections might be obviated by some deviation of the line, I found, after passing Barmouth, a very favorable country to the mouth of the Disynwy River, where fresh difficulties might be looked for; but the levels being good, I continued coastwise past Towyn to the Estuary of the Dyfi, or Dovey River, and then followed the north side of the valley of that stream past Machynlleth, reaching Dinasmowddy by a very circuitous route; but, having attained this point, a series of inclined planes for several miles together, averaging 1 in 40, followed by a tunnel 3 miles in length, would be required to surmount the pass of Bwlch-y-Fedwyn; after which the valley, to beyond Llanfair, descended 25 feet per mile for many miles in succession. To reach Shrewsbury in this direction was, therefore, hopeless, and the inquiry appeared limited to a choice between the Bala and the Carno passes.

The route towards the latter is, as just described, to Machynlleth, and from that town to the Wynnstay Arms Inn, near Llanbrynmair, the levels are as favorable as could be expected through such a country, but the following 3 or 4 miles are exceedingly steep, certainly little better than 1 in 90, (58 feet to the mile,) and a tunnel of something more than a mile in length requisite. The Carno summit is 690 feet above the sea, after which the descent is nearly 23 feet per mile for 6 miles, to the banks of the Severn above Newtown. From Newtown to Bishop's Castle some considerable difficulties occur, after which a good line may be found by Ludlow to Worcester, to which city I carried down the levels.

From Worcester, as I have been informed by parties competent to judge, a favourable Railway course may be traced to Oxford, and thence by the great Western Railway, or by Tring, to London; the total distance from Porth-Dynllaen, as near as can be ascertained, being about 260 miles by the Tring line, and some miles longer by the Great Western Railway.

Valley of the Mawe.

Reverting to the central route, it was found that by commencing to ascend somewhat before reaching Barmouth, an inclination of 1 in 462 (about 11½ feet per mile) might be obtained for 14 miles on the north side of the valley of the Mawe, passing through a half mile tunnel, close to the north of Barmouth (where the Railway turns from the coast); and, after leaving Dolgelly, striding across the valley by a viaduct of extraordinary dimensions.

Dolgelly to Drws-y-Nant.

From the Dolgelly viaduct, a gradient of 1 in 150 (35 feet per mile) for rather more than 10 miles, is to be attained along the sides of the valley, passing Drws-y-Nant, and arriving at a ridge which can only be passed by a tunnel of 2 miles in length, the inclination through which is reduced to 25 feet per mile, reaching the summit 590 feet above the level of the sea; and from which summit the line descends gently (at little more than 8 feet to the mile), along the southern shores of the Bala Lake, to near the town of Bala. From thence to near Llangollen, the Railway may be laid out to follow the natural descent of the valley of the Dee for upwards of 20 miles, and not exceeding 12 feet to the mile.

Bala to Llangollen.

From these brief descriptions of the several routes, and from inspection of the diagram sections on the map, it will be evident that the lowest pass is that by the lake of Bala, and that it may be surmounted by acclivities on which locomotive engines can travel, at least not very inconveniently; the gradients exceeding 12 feet in the mile, only extending over a length of 12 miles; at the foot of which division an assistant engine being stationed, the trains may be kept to the regular speed and load; though it is probable the traffic may not require this extra aid.

Llangollen to the Grand Junction Railway.

Porth-Dynllaen to London, 260 Miles.

From Llangollen, some exploring levels were taken by Chirk, Ellesmere, Wem, and Newport, falling into the Grand Junction Railway to the north of Wolverhampton; the total distance from Porth-Dynllaen being about 130 miles, and thence, by the Grand Junction and the London and Birmingham Railways, to the metropolis, 130 miles further; making the distance the same as by the Carno Pass, and thence by Worcester and Oxford, viz., 260 miles.

From Chirk, by Ruyton and Shrewsbury, and the right side of the Severn Valley to Ironbridge, and thence, nearly direct to the Grand Junction Railway, at or near the Wolverhampton summit, would be only two or three miles longer than by Ellesmere and Newport.

Besides the difficulties which the passage across the port of Barmouth, and the obstacles at the summit of Carno present, other objections seem to arise. From Porth-Dynllaen, by Bala, to the Grand Junction Line, requires only about 130 miles of new Railway, while from Porth-Dynllaen, by Carno and Worcester, at least 215 miles would be wanted, viz.:—From Porth-Dynllaen to Newtown, 88 miles; from Newtown to Worcester, 62 miles; from Worcester to Oxford, 55 miles; from Oxford to the Great Western Railway, 10 miles. Total, 215 miles.

And certainly the district from Oxford, on the South Line, by Worcester and Carno, to Barmouth, being almost exclusively through a purely agricultural or pastoral country, could not offer much probability of parties undertaking to construct from 80 to 90 additional miles of new Railway, beyond the extent required between Wolverhampton and Barmouth, on the Central Line, by Chirk and Bala.

It would also seem that the great interests involved in the London and Birmingham, and in the Grand Junction Railways, would be more likely to come forward to promote a packet line which would leave the latter Railway north of Wolverhampton, or perhaps north of Stafford; thereby insuring to them a valuable traffic.

The Central Line, by Bala and the valley of the Dee, presents the further advantage, that

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by the Railway proposed to be made by parties locally interested, from the Ruabon Collieries, and adjacent iron works, to Chester, and by the line from Chester to the Mersey at Birkenhead, Liverpool, Manchester, and the North of England would have a direct connexion with the packet port; Liverpool being, by this line of Railway, only about 120 miles from Porth-Dynllaen. And, in addition, great public benefit may be expected by affording means of taking the coal and limestone into the interior districts, pervaded by the Bala line, at present totally devoid of these advantages: and, on the other hand, going far to render the estuary of the Mersey as available for shipping the minerals of central North Wales, as the Severn is for the produce of the mineral basin of South Wales.

Central Line, by Bala, preferable to the South Line.

Considering, then, all these circumstances, that the Bala Line presented decidedly the best engineering features, had to encounter fewer difficulties, and was, therefore, on the whole, less expensive, and certainly not longer than the Carno and Worcester Line; and possessed, besides, facilities for almost direct communication between Ireland and the great manufacturing and commercial districts in the central parts of England; and, by means of other Railways branching from these districts, to the north as well as to the east as far as Hull, and into the midland counties, none of which parts of England would be attainable except by very circuitous routes from the Worcester line, I have concluded decidedly to give the preference to the route by Bala and Llangollen, before all others to the south.

It now only remains to compare the line, keeping altogether to the north, with the central route by Bala.

Crewe and Chester Railway.

When I made my surveys, in the spring of 1836, the Railway from the Grand Junction at Crewe to Chester, had not received the sanction of Parliament. This line was projected to give Chester a connexion with London, and to obtain a shorter line than the Grand Junction Railway as a route to Liverpool. But the latter Company have a Bill now passing through Parliament to authorize the construction of an entirely new Branch Railway from Moore, near the Duke of Bridgewater's canal, north of Preston Brook, to cross the Mersey at Fidler's Ferry, and to join the Liverpool and Manchester Railway at Huyton. In so doing, three inclined planes will be avoided, between Moore and Huyton; and the distance from Crewe, by Fidler's Ferry, will be rendered as short as from Crewe, by Chester, to Birkenhead; and passengers and goods will be brought to the very centre of the town, and on to the dock-quays of Liverpool, instead of having the estuary of the Mersey to traverse, as would be the case from Birkenhead.

London to Liverpool, 200 Miles.

In either case, the Railway distance from London to Liverpool may be considered as about 200 miles.

Consideration of the Northern Lines.

Considering the Crewe and Chester Railway as about to be commenced, and as an available route, I shall proceed to consider a line towards a packet station, keeping wholly to the north of all the Welch mountains.

Leaving the Grand Junction Railway, the country from Crewe to Chester is generally flat, and the levels favourable; the line running almost parallel, for the whole distance, with the Nantwich canal. From near the termination of the Chester and Crewe line, to pass to the south-east of Chester, some difficulties and considerable expense will be encountered in crossing the river Dee, above the head of navigation, after which, a route, probably not very costly, and offering levels particularly good, naturally presents itself, following the south shores of the estuary of the Dee, at the foot of the Flintshire hills; running through the town of Flint, under Holywell, past Mostyn-Quay, close within the point of Ayr, and below Rhyddlan, crossing the river Clwyd, and so on to Abergele, a distance of upwards of 30 miles from Chester. Ten additional miles along the sea coast would complete a communication to the bay, between the Great and Little Ormes' Heads, which has been styled by some Port Wrexham, by others St. George's Harbour, and which has been more than once proposed should be constituted the packet station to Dublin, chiefly, it would seem, from the facility of forming access thereto by a line of Railway. From Orme's Bay to Dublin is nearly 100 miles' sea voyage. Its capacities, and its eligibility for a packet port, I shall not at present discuss.

The principal local impediments between Chester and Abergele would be the passing through Flint and by Mostyn-Quay, and the interference with the northern part of Talacre Park. In proceeding from Abergele towards Bangor, the difficulties commence. A practicable, though expensive route may be had, by keeping parallel to the present mail coach road, penetrating by the same pass to the banks of the Conway river. As carriages, propelled by locomotive engines, cannot pass the suspension-bridge at this place, and as the bridge has a direction unsuited to the forward course of the Railway, a second embankment across the river here, and a solid bridge, must be constructed; the latter at great expense. It appears to me, on the whole, after consideration of the levels and surveys I have had taken, that the Railway passage of the river at Conway should be below the present bridge, although it must thereby interfere injuriously with the port. A passage above the present bridge, and above or through the town, if not impracticable, is certainly involved in the greatest difficulties.

Two tunnels will be required immediately beyond Conway; one at Penman-Bach, the other at Penman-Maur; and to maintain favorable levels, these tunnels must be of considerable length; between these two headlands thus tunnelled through, a very heavy embankment, or perhaps a viaduct must be raised, to avoid turning too abruptly round the promontories, as well as to shorten the tunnels, and keep them straight, or as little as possible upon the curves.

After passing Penman-Maur, it would be matter of very grave consideration how to attain or pass Bangor, whether coastwise, or by an inland route; the difficulties in either case are formidable. If coastwise, to get by the park and ground of Penrhyn Castle, and the port and town of Bangor, would require very expensive constructions to avoid injury or

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interference with valuable rights and property; abrupt curves would be unavoidable, and probably at least one plane of severe inclination. The impression I have had from personal observation, and from the sections, leads me to conclude the inland line to be preferable; this would keep a high level, and bending towards the sides of the mountains, would pass the Holyhead road entirely to the south of Penrhyn-park, and traverse the high ridges south of Bangor, and crossing the valley along which the new road to Carnarvon passes, arrive exactly opposite the Menai Bridge, in a direct line therewith. From Penman-Maur to the Menai Straits, favourable levels on this route may probably be maintained, but the section is very rough; tunnelling, viaducts, and some heavy earth-work will be requisite.

In continuing to consider the possible course of a Railway to Holyhead, the construction of a second bridge across the Straits of Menai is too great an undertaking to be seriously contemplated; besides, unless locomotive engines could pass over it, no end would be attained. Suspension bridges have been proved to be wholly unfit to sustain the weight and action of the engines, and no other description of bridge could be brought within any reasonable limits of expense. If Holyhead is to be the packet station, terminating a line of Railway from London, the present bridge across the Menai Straits must be made use of, the locomotive engines starting from, and stopping at each end. To lay down baulks of timber on the flooring of the bridge, and to horse the Railway carriages over, one at a time, appears the simplest, and, perhaps, the only mode; taking care to adopt proper precaution to prevent the action of the strong gales, to which this magnificent structure is exposed, from seriously affecting, as they probably might, the adjustment of the guage and level of the Railway track, and to guard the rails from being interfered with by the passage of the ordinary traffic which must necessarily continue. Many difficulties of curve and gradient, and considerable expense of construction, would arise between the Menai Bridge and the Llanfair Lake, near the entrance gates of Lord Anglesey's demesne of Plas Newydd.

Plas Newydd to Maeldreath Marsh.

From Llanfair lake the direction must be considerably to the south of, and be more circuitous than the new road across Anglesey to Holyhead. The Railway and Road being to each other, nearly as the arc and the chord of a circular segment: this is requisite to keep down, as low as possible, the long embankment over Maeldreath Marsh, as well as to obtain the lowest and narrowest passes in the parallel and adjacent ridges of hills. An undulating section, of about 16 feet to the mile, may thereby be obtained, though at much expense, particularly in crossing the marsh, where there is reason to doubt the solidity of the soil, and its capacity to sustain a heavy embankment.

Lake Goran.

Stanley Sands.

Terminus at Holyhead.

From Llanfair lake the route will be by the village of Llandaniel, thence pointing towards the town of Aberffraw; but after crossing the Cefni river, which runs through the Maeldreath Marsh, the Railway would take a direction to the north of west, and not approach Aberffraw nearer than the north side of lake Goran; the line then keeps to the south of Tallyllin Chapel to Llanfaelog Mill, and the course becoming nearly north-west, will pass with very good levels over a great sandy plain, and among some small lakes, to the Stanley Sands; crossing which, by a new embankment, the line will repass the mail road near the Stanley Gate, and keeping to the north of the road, proceed to the west side of Holyhead Harbour, to terminate near the graving docks, on the south pier; as there would be insuperable difficulties in getting to the present landing pier past the town of Holyhead.

272 miles from Holyhead to London, *via* Chester and Crewe.

The distance from Chester to Holyhead would be about 82 miles, on the route just described, and from Chester to Crewe 22 or 23 miles, making nearly 105 miles from the Grand Junction Railway; and the total distance from London to Holyhead, on this northern route, about 272 miles.

Bangor to Porth-Dynllaen, by Llanderrog and Carnarvon.

Considerable pains were taken to determine the practicability of extending a Railway line from the Holyhead road, two or three miles south of Bangor, to Porth-Dynllaen, and a route on a high level, past Carnarvon, was at length found, the gradients of which would have been very good generally, but the construction would be expensive, and four tunnels, and four or five viaducts requisite, and probably some severe curves; besides unavoidably passing through the park and demesne of Lord Newborough, near Llanderrog.

On referring to the description of the line from Abergele to the crossing of the Holyhead road, south of Penrhyn Park, mentioned in a preceding paragraph, and considering the same in connexion with the extension to Porth-Dynllaen, the physical difficulties will be found to be very considerable, although the Railway gradients would probably be unobjectionable. But so far as relates to attaining Porth-Dynllaen by a Main Trunk Line, I apprehend the northern route, as above, need not be taken into the consideration.—It is nearly 20 miles longer from London than the Bala Line, with about 113 miles of new Railway to be constructed between Crewe and Porth-Dynllaen; and in place of affording access, as is done by this latter line, to the very heart of North Wales, serving as a grand artery to accommodate the districts north and south, and extending to them the advantages and facilities for Railway communication, such a route would be a coast line for nearly 90 miles, bounded by the sea on one hand, and by almost inaccessible hills on the other, having no connexion or means of connexion but with the places it may actually pass.

The northern route then should be viewed only as a means of attaining by Railway, either Holyhead or the anchorage or port between the two Ormes' Heads, which has been called St. George's Harbour; and this at once raises the question of the comparative merits of Holyhead, St. George's Harbour, and Porth-Dynllaen, as packet stations for the departure of mail steam boats for Dublin. And here, as I have only been called upon to report on the various lines by which a Railroad could be carried from London to Porth-Dynllaen, my discussion should, perhaps, properly cease, and I should proceed to the details of the line I have recommended.

But I cannot refrain from previously adding a few words, or rather extracts from better

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authority than mine, upon the merits of the above three harbours; and will afterwards offer a few remarks on the great principles to be kept in view, in forming a new and rapid communication between London and Dublin.

Treasury Minute, 16th October, 1836.

In consequence of a Treasury Minute, of the 14th of October, 1836, directing surveys of harbours best suited for packet stations, and most likely to facilitate steam communication between this part of the coast of Great Britain and Dublin, a report was made to the Lords Commissioners of the Admiralty, early in the following month, by Captain Beaufort, R.N., their hydrographer, and transmitted to the Treasury. On the motion of Lord Viscount Clive, these proceedings were presented to the House of Commons, and ordered to be printed on the 14th of March, 1837. They have thus become public documents, and I beg to annex

CAPTAIN BEAUFORT'S REPORT.

Captain Beaufort's Report.

"As long as the Dublin Mails are carried by coaches, on common roads, the best place of embarkation, in every respect, will he Holyhead, which is only 62 statute miles from Kingstown harbour, and which only requires a little elongation of the pier in order to admit a larger class of steam vessels at low water.

"But if a Railroad should be constructed for that purpose, it would be probably led to another port, because it is not likely that a steam carriage, with a loaded train, would be allowed to traverse the present chain bridge at Bangor, and a new bridge there, on arches, would add enormously to the expense of the undertaking; besides the objection that would be raised to such a bridge, from the obstruction it would give to the navigation of the strait.

"Two places have been proposed as suitable termini to a direct Railroad, and either of them easily capable of being converted into a pier-harbour for steam packets; Porth-Dynllaen, on the western shore of Carnarvonshire, and Orme's Bay, on its northern shore; and both have been sufficiently examined to warrant the following statement, without further survey:—

"Porth-Dynllaen is 69 miles from Kingstown, and the courses would be W.N.W. and E.S.E., so that the most prevalent wind (south-west) would be a side wind both ways, an advantageous circumstance to steamers, as it enables them to steady themselves by canvass.

"From this place the survey of the interior by Mr. Rastrick,* Civil Engineer, shows that a feasible line of Railway may be obtained through the Merioneth mountains, so as to connect it with the Great Trunk Railroad now constructing from London to Liverpool.

"Orme's Bay is 97 miles from Kingstown; but as the packets would have to round the north point of Anglesey, the course across the Channel would be west by south, and east by north, thus bringing the usual wind and sea nearly ahead and astern. On the other hand, a much shorter and more level Railroad than that from Porth-Dynllaen, would connect Orme's Bay with the above-mentioned Trunk, but the great difference of distance of the two places from Kingstown leaves the comparative balance of their merits much in favour of Porth-Dynllaen.

"(Signed) F. BEAUFORT.

"*4th November*, 1836."

The great principle to be kept in view, in considering the means of transit between London and Dublin, is that embodied in the preamble of certain Acts of Parliament, and previously laid down by more than one Select Committee of both branches of the Legislature, viz.:—"That it is of the highest public importance, that the communication between the two capitals should be as easy and expeditious as possible;" and, as a consequence or corollary, I will add, that to bring the capitals within one night's post of each other, would be, perhaps, obtaining at least one if not both of these objects in the most complete manner. Now, as the sea voyage is always more or less uncertain, and at the best, even with the most successful adaptation of recent improvements, steam boats can only travel by sea at half the speed that locomotive engines with their trains can travel by Railway, it is a mere truism to observe, that the most easy and expeditious route between London and Dublin, must be that which, *cæteris paribus*, has the shortest space to traverse by open sea. From London to Dublin by Orme's Head, and by Porth-Dynllaen, the distances are nearly equal; but the sea voyage is nearly 30 miles longer by the former, besides the certainty of the steamer having more frequently to encounter head winds. The length of the voyage from Orme's Head would, therefore, always be at least three hours longer than from Porth-Dynllaen, and the total journey from London, two hours more.

A Railway line from Chester to Holyhead, would be 12 miles longer than a Railway by Bala to Porth-Dynllaen, and with the delays in passing the trains across the Menai Bridge, and getting from the Railway terminus to the packets, would probably make nearly an hour's difference in time. On the other hand, the sea voyage from Porth-Dynllaen, is six miles longer than from Holyhead; but there is a much greater probability of assistance from the prevailing winds, and the voyages may be considered to be, on the average, of equal length. This would, on the whole, give a difference of an hour in favour of the Railway line to Porth-Dynllaen, besides the advantage of ease to the traveller by having a continuous Railway, and that to the very side of the steam-packet quay, which I apprehend would not be attained at Holyhead; especially if the outer pier has to be lengthened to admit steamers of a larger class, which description of boat it is universally admitted, must be introduced on these stations.

The question has, therefore, now narrowed into the selection of Holyhead or Porth-Dynllaen as a packet station, the latter having an hour's advantage in time, to which may be very fairly added, the superiority of country pervaded by the Railway through the very centre

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[*] Captain Beaufort was not aware, at the time of writing this Report, that I had been associated with Mr. Rastrick in this matter, or that I had had the exclusive direction of the surveys and levels which led to our joint Report.—C. V.

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of North Wales, giving access at the same time to several watering places of most resort in that country, as well as to districts much frequented by the travelling portion of the public.

On the Holyhead Line from Abergele to the packet station for 50 miles, will be a series of difficult and expensive operations, without the prospect of much return, except from the direct travelling to the port of embarkation, and the town of Bangor.

The same distance from Dolgelly to Porth-Dynllaen, passes by a number of flourishing places, and opens communications to several towns of importance on the south.

Taking the Railway travelling at 27 miles an hour, with the first class or mail trains,* and at 12 miles an hour with improved steam boats, and considering the retardations or accelerations previously mentioned, the whole journey from London to Dublin will be performed in 16 hours, by way of Porth-Dynllaen, and in 17 hours by way of Holyhead. This difference of an hour will, in most instances in winter, make the difference between saving and losing the post, in replying to important communications, besides giving at all times an additional hour for answering letters in Dublin. Looking at the probability of the mails hereafter leaving London (for various reasons which it is easy for those who have studied the subject to assign,) at 7 o'clock in the evening, in place of 8, letters may reasonably be expected to be delivered in Dublin in ordinary course by noon of the following day; and the return mail starting from Dublin at 3 o'clock on the same afternoon, would reach London by 8 in the morning of the next day, in time for distribution by the delivery of the general post letters from other places. It is manifest that in winter and at other times when the westwardly winds prevail, the hour's difference in each trip would make the difference between the possibility or otherwise of answering letters, which, in government affairs, military movements, bank operations, &c., is often of the very highest importance.

On the whole, it appears to me clear, the advantages are decidedly in favour of Porth-Dynllaen as a packet station, and if Holyhead had not already existed as such, no hesitation could have arisen as to the determination of the question.

It may perhaps not be useless to compare Orme's Head and Liverpool as points of departure for steam packets to Dublin. At the rate of transit just assumed, the journey from London to Dublin, by Orme's Head, would be accomplished in about 18 hours. With the New Branch Railway before mentioned, so contemplated by the Grand Junction Company, the distance from London to Liverpool, by Railway, will scarcely exceed 200 miles, or $7\frac{1}{2}$ hours for first class or mail trains, adding $11\frac{1}{2}$ hours sea voyage, and half an hour from the arrival at the Liverpool station, to the departure of the packet, will make a total of 19 hours. Now, the gain of the hour by Orme's Head over the route by Liverpool, will not answer the great purpose of bringing the two capitals within one day's post of each other; while the difference of length of sea voyage would not be a sufficient reason for the formation of a Railway and the establishment of a packet station, simply to compete with Liverpool, where such an establishment is already completely organized, and to which town a Railway already exists.

The following is a comparative view of the different lines of communication from London to Dublin according to the respective times and distances before enumerated, viz.:—

	Length of Railway.	Length of Sea Voyage.	Total time between London and Dublin.
	Miles.	Miles.	Hours.
1. Porth-Dynllaen Line ...	260	69	16
2. Holyhead Line	272	$62\frac{1}{2}$	17
3. Orme's Head Line	230	$96\frac{1}{2}$	18
4. Liverpool Line	200	$130\frac{1}{2}$	19

To each of these times should be added the half hour necessary to proceed between the Wharf in Kingstown Harbour, and the General Post Office in Dublin; also the usual time to sort, distribute, and collect letters, all of which trench greatly on the interval between the arrival and departure of the packets, rendering the gain of an hour exceedingly precious when it just turns the scale, as would continually be the case in the winter months, and at the periods of the equinoxes.

A system has been latterly adopted in London, of having (by the two-penny post carriers) a second delivery of letters arriving in town from the country by late mails, up to 10 or 11 o'clock in the morning. Applying this to the return of the mail from Dublin would permit its departure from Kingstown being delayed till 6 o'clock in the afternoon of the preceding day, giving three hours additional time to answer letters, and to meet the contingencies of delay from adverse winds.

Even with this assistance an extra hour would be of importance, and I submit it as my humble opinion, that it is only by rendering the average time of transit as short as possible, that the advantage of one night's (or day's) post between London and Dublin can be expected to be attained; if this cannot be done, the packets might as well sail from Liverpool.

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* This speed, or even 30 miles an hour, may be insured, and the contingencies of Railway travelling avoided or made up, by having, invariably, *two* powerful locomotive engines to each mail train. This ought to be compulsory on the Companies, who should be remunerated, by being allowed to make an extra charge to passengers; and should also receive a proper allowance from the Post Office.

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There are several other considerations connected with this question, to which I cannot do more than generally advert. The principal one is how far private enterprise may be likely to go in forming the chain of Railways, from the Grand Junction to the Packet Station; and to what extent it may be found advisable or necessary to claim Government aid in carrying forward the project, and out of this arises the consequential inquiry, viz., if the Government should be induced, as in the case of the Holyhead road, to patronize or execute any portions of the Railway, should not such line pass centrally through the country, affording the utmost general advantages, independent of being the route to a packet station; in fact be a Main Trunk Line, such as those now laying out by your Commission in Ireland.

The degree of interest taken by the landed proprietors in Staffordshire, Shropshire, Merionethshire, Montgomeryshire, and the southern parts of Carnarvonshire, and the terms on which those whose lands are to be taken may be disposed to treat, must also, in some respects, influence the consideration of the line by Bala.

I do not think any very material difference in the cost of working either the line to Holyhead, or to Porth-Dynllaen, would accrue. But it is probable the estimates of the two routes will differ in favour of the latter line. The cost of the line from Porth Dynllaen to Bala, 64 miles, has been calculated by me in detail. I have not done the same with the Holyhead Line, from Abergele to the Head, but the passage of Conway, Bangor, and through nearly one-half of Anglesey, will evidently require costly constructions, several of which can scarcely be accurately estimated for, without considerable additional detail of level and survey, and even borings; but sufficient is manifest from the levels to leave no doubt of the expense of this section considerably exceeding that of the above distance on the other line.

I may probably have omitted to enumerate some further subjects worthy of inquiry, but having already dwelt too long on matters, rather of general policy than of engineering, I shall hasten to a conclusion, after giving some details of the line I recommend.

Detailed description of the Route to Porth-Dynllaen.

Pwllheli. Cricceath. Tremadoc. Harlech. Llandanwg.

Starting from the cliffs near the extremity of the promontory at Porth-Dynllaen, at an elevation of 70 feet* above the level of the sea at low water, the general course of the line will be parallel to the Pwllheli road, with a gentle ascent for three miles, and over favorable ground. The heavy cutting in forming the spurs of the Rivel Mountains may be, probably, diminished on further examination in detail. A descent of about $14\frac{1}{2}$ feet per mile, for 5 miles, brings the line close down upon Pwllheli, from which place to Clan-y-llynan, a distance of 6 miles, a horizontal line along the sea shore is attainable. The earth-work shown on the detailed section, beyond Pwllheli, may be probably diminished in setting out the line, by occasional deviations. A gentle rise next commences, and continues some distance beyond Cricceath, at which town the course of the line turns inland, towards the Tremadoc embankment, to which a gentle fall occurs, commencing about midway from Cricceath. After crossing the sands of Traeth Mawr and Traeth Bach, and the point of the peninsula between them, a horizontal line for nearly 10 miles has been laid out, running generally along the coast, past Harlech and Llandanwg, to near Llanddwywe. The asperities of the section at the peninsula south of Tremadoc, and also between Harlech and Llandanwg, may be much softened by deviations of the line, to keep lower down along the face of the cliffs which run close to the sea shore.

Barmouth. Llanelltid. Dolgelly Viaduct. Drws-y-Nant. Two Mile Tunnel at the Summit. Bala Lake. Corwen. Llangollen.

At Llanddwywe commences a rise of 1 in 462 (11 feet 5 inches per mile), which continues uniform for 14 miles. The line leaves the coast at Barmouth, and getting past that town by a tunnel of about half a mile, proceeds for several miles along the left bank of the Maw or Mawddach river, but is finally compelled to cross that valley above the point where the river Onion unites with the Mawe, at the village of Llanelltid, about a mile west of Dolgelly, and where the road turns off to cross the river to Dolgelly and Drws-y-Nant. The viaduct necessary here will be of a gigantic character, and of unprecedented height; but having 8 miles of very favourable country on each side, the great cost of this construction (£120,000) will be spread over 16 miles of the Railway adjacent, and the average expense of this portion of the line will not be so very materially increased. At the Llanelltid, or to use the name of a place better known, at the Dolgelly viaduct, the inclination of 1 in 462 terminates, and a gradient, rising 1 in 150 (35 feet $2\frac{1}{2}$ inches per mile) commences, which is continued for upwards of 10 miles, generally keeping on the left side of the valley, to about a mile beyond Drws-y-Nant, where the summit tunnel begins. This tunnel must be 2 miles long; the inclination through it has been reduced down to 25 feet per mile, or 1 in 211; at its north-eastern extremity the Railway arrives at the summit, 590 feet above the sea at low water. From this point the descent begins to the east, and the gradient is 1 in 640, or $8\frac{1}{4}$ feet per mile, along the south side of the Bala Lake, to a mile and a half beyond the town of Bala, a distance of more than five miles, and where the detailed sections terminate, with the valley of the river Dee open, the course of which must be followed to Corwen, and from thence past Llangollen and the Pont-y-Cystle aqueduct; and, with the exception of some difficulties between Corwen and Llangollen, a line, generally very favourable, may be obtained, with gradients probably not exceeding 12 feet to the mile, or 1 in 440.

Pont-y-Cystle Aqueduct.

From the Pont-y-Cystle aqueduct, the first series of exploring levels in continuation, passed by Chirk and parallel to the Ellesmere canal; thence eastward to the north of

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* When the position and section of the new Packet Pier at Porth-Dynllaen are definitely fixed, a change of gradient will enable this height to be considerably reduced, so that the terminus will not be at an inconvenient elevation above the pier at the landing place.

Appendix A. No. 3.

Report on the various Lines by which a Railway could be carried from London to Porth-Dynllaen, in North Wales.

Wem, and then by Newport to the Grand Junction Railway, in the vicinity of Brewood, north of Wolverhampton; but though a practicable line was to be obtained in that direction, it would be expensive, and I would recommend a very minute search to be made, both to the north and to the south of this route—on the north, in order to consider if it might not be advisable to unite with the Grand Junction Railway, to the north of Stafford, at the point where the new line to Manchester, through the potteries, will branch off; and, provided no material addition be made to the whole distance to London, such a point of junction might be advisable, as a considerable length of Railway construction might be saved, and the packet line would be brought more centrally on to the Grand Junction Railway, and otherwise connect better with Manchester, the Potteries, &c.

But more particularly should an examination be made to the south, to determine the practicability of bringing the important town of Shrewsbury within the range of the travelling line to Ireland, and of retaining its place on the main route from Birmingham and London.

Some time since, a Railway was projected between Wolverhampton and Shrewsbury, but terminating, I believe, so as not to be well adapted, in respect of level and direction, for being extended towards the Valley of the Dee. And it is conceived that it would be desirable to pass Shrewsbury on a high level, so as to soften the descent from the point of diversion south of Ellesmere, which is nearly at the junction of the Montgomeryshire with the Ellesmere Canal. Such a route might probably be continued from Shrewsbury, down the right banks of the Severn, and pass opposite to Coal Brook Dale, and between Ironbridge and Broseley, and then in a direct eastwardly course, to join the Grand Junction Railway, near the Wolverhampton station.

Difficulties may doubtless arise on points of this route, but it has many advantages: and from the Report of my assistants, I have reason to believe that such a direction for the Railway would not be more expensive than the line by Wem and Newport. No trouble should therefore be spared, in endeavouring to fix the route to North Wales, through Shrewsbury.

To return to the line from Porth-Dynllaen to Bala:—The following is the list of the inclinations or gradients, commencing at the Packet port, and terminating to the north east of Bala, viz.:—

Table of Gradients from Porth-Dynllaen to Bala, 64 Miles.

STATIONS.	DISTANCES.				GRADIENTS.		Difference of Level.	Rise or Fall.	Height above the Sea at Low Water.
	From Porth-Dynllaen.		Intermediate Distances.		Feet per mile.	Ratio of Perpendicular to Base.			
	Mls.	Chns.	Mls.	Chns.			Feet.		Feet.
Porth-Dynllaen	"		"		"	"	"	"	70
Near W. end of Tunnel	3	00	3	00	$7\frac{1}{3}$	1 in 720	22	R.	92
Pwllheli	8	00	5	00	$14\frac{5}{12}$	1 in 367	72	F.	20
Clan-y-llyan	14	00	6	00		Horizontal			20
Near Morfa	19	12	5	12	$5\frac{1}{12}$	1 in 1043	26	R.	46
Tremadoc Embankment	22	12	3	00	$6\frac{7}{12}$	1 in 804	23	F.	23
Llanfihangel	24	00	1	68	$1\frac{2}{3}$	1 in 3161	3	F.	20
Llanddwywe	32	40	8	40		Horizontal			20
Llanelltid	46	40	14	00	$11\frac{5}{12}$	1 in 462	160	R.	180
Near Drws-y-Nant at S. W. end of the Summit Tunnel	56	54	10	14	$35\frac{1}{3}$	1 in 150	360	R.	540
At N. E. end of the summit Tunnel	58	54	2	00	25	1 in 211	50	R.	590
Beyond Bala	64	00	5	26	$8\frac{1}{4}$	1 in 640	44	F.	546

66 Miles further to Grand Junction Railway.

It has been previously stated, that from this terminus, near Bala, to the Grand Junction Railway, would be about 66 miles further.

Estimates.

I have also made very detailed Estimates of the above portion of the line from Porth-Dynllaen to Bala, upon the same principle of construction and of dimensions as adopted in the Estimates of the lines through Ireland, but with higher rates for the ordinary masonry, which is here taken at 6*d.* per cubic foot, a sufficient price in a country where materials and labour are so cheap and abundant. The earth-work is priced at 1*s.* per cubic yard, for a mile lead, and shorter or longer leads, in proportion; but a very large proportion of the earth-work on this section will be thrown into spoil, or taken from side cuttings, so that the average price of the whole is rather under 9*d.* per cubic yard.

Masonry.

Earth-work.

Land.

The land is estimated at a constant price of £50 per acre, which I am informed, by competent persons, is a very fair average value for the districts for which the course is taken.

Viaduct.

Tunnels.

The great Dolgelly viaduct is priced at twenty shillings per cubic yard, which, from the vast quantity of rough solid work, I take to be quite sufficient. The tunnelling has been estimated at £40 per lineal yard; the fencing at 4*s.* per lineal yard, for both sides of the Railway. The Railway laid complete (upon Kyanized longitudinal fir sleepers, with broad-based rails, having a continuous bearing on the wood, and without chairs), with drains and ballasting, has been taken at £4,400 per mile of double trackway, being the same price as estimated for on the Irish lines.

Upper Works of the Railway.

Per Centage.

The usual per centage has been put, and the carrying establishment and management added to all.

Appendix A.
No. 3.

Report on the various Lines by which a Railway could be carried from London to Porth-Dynllaen, in North Wales.

Abstract of Estimates from Porth-Dynllaen to Bala, 64 Miles.

£22,454 per Mile, for Railway Works only.

The following is an Abstract of the Estimates of the cost of the 64 miles from Porth-Dynllaen to Bala, viz.:—

EARTH-WORK.—15,580,945 cubic yards (9*d.* per yard, nearly),		£581,855	
MASONRY.—Tunnelling (2½ miles,)	£176,000		
Dolgelly Viaduct (35 arches,)	118,497		
135 bridges and river culverts, besides smaller culverts,	85,408		
		379,905	
LAND.—810 acres,		40,500	
FENCING.—(On both sides throughout) 112,640 yards,		22,528	
RAILWAY.—(Laid complete for double line throughout,)		281,600	
			£1,306,388
Contingencies on the Railway, 10 per cent.,			130,639
			£1,437,027
CARRYING ESTABLISHMENT, including engines, carriages, waggons, stations, sheds, workshops, &c.,			64,000
MANAGEMENT, including parliamentary, engineering, legal, and directors' expenses, and salaries, superintendence, office establishment, travelling charges, stamps, printing, stationery, advertising, and minor contingencies, 5 per cent.,			71,851
Total,			£1,572,878

£24,576 per Mile, including Contingencies, Carrying Establishment, and Management.

Being an average of £24,576 per mile, on 64 miles.

In respect of the cost of the further 66 miles, to unite with the Grand Junction Railway, I consider, from studying the section already taken, from my general knowledge of, and information acquired, respecting the country, as well as from a comparison with the cost of surmounting the still greater difficultes of the line, as noticed above in detail, and from my experience in estimating for and executing Railways, I am justified in pronouncing an opinion, although the line is not definitely fixed; and I venture to state, that the expense, including the same ratio of contingencies, carrying establishment, and management items, as given in the preceding abstract, may be fairly computed to fall within £20,000 per mile.

The general result will then stand thus:—

From Porth-Dynllaen to Bala, (64 miles)	£1,572,878
From Bala to Grand Junction Railway, (66 miles)	1,320,000
Total,	£2,892,878

Covering Estimate.

And this I consider to be quite a covering estimate, as the levels between Bala and Porth-Dynllaen having been taken only to establish the general practicability, and to determine the character of the gradients, much diminution of earthwork, &c., may be looked for when the line is definitely laid out.

I have not added any thing for the improvement of Porth-Dynllaen, as I have no materials for an accurate estimate; besides, what might be wanted for that purpose may be relied upon as obtainable from the above gross sum, which is abundantly sufficient. It is also probable the sum to be expended would not exceed what would be required to extend the pier at Holyhead, and render it capable of sheltering, at low water, the larger class of steam boats.

£3000 per Mile to be saved, by adopting inferior Gradients.

And £2000 per Mile more saved, by laying out a Single Railway Track at first.

I must further observe, that by adopting inferior gradients along the sea-coast between Barmouth and Porth-Dynllaen, and from Bala to the Grand Junction Railway, not exceeding say 18 to 20 feet in the mile, and falling and rising, so as to keep more nearly to the natural surface of the country; and by adopting occasional short inclinations of from 1 in 100 to 1 in 200, for the purpose of avoiding continuous earth-work, a saving of about £3000 per mile might be made: and to lay down, in the first instance, a single Railway track, with occasional sidings and crossings, might be probably deemed sufficient, and would effect a further immediate economy of £2000 per mile; so that an expenditure, in the first instance, of two millions and a half of money, would complete a Railway communication between London and the proposed new Packet Station for Dublin, at Porth-Dynllaen, in North Wales.

Having now completed my task, I will not venture to make any observations on the importance of the results which the completion of such a work, and the establishment of such a communication between London and Dublin, in connexion with Main Trunk Lines of Railway through Ireland would produce. The reflections which arise are of the highest order, but are to be embodied in language by the statesman, rather than by the engineer.

I have the honor to be, Gentlemen, your very obedient servant,

CHARLES VIGNOLES, *Civil Engineer*.

4, TRAFALGAR-SQUARE, LONDON,
29*th November*, 1837.

APPENDIX A.

No. 4.

REPORT

ON THE SEVERAL LINES OF RAILWAY THROUGH THE NORTH AND NORTH-WESTERN DISTRICTS OF IRELAND,

AS LAID OUT UNDER THE DIRECTION OF THE COMMISSIONERS;

BY JOHN MACNEILL, CIVIL ENGINEER, F.R.S., M.R.I.A., &c.

Appendix A. No. 4.

Report on the North and North-western Lines of Railway.

To Major H. D. Jones, Secretary to the Railway Commission.

Sir,—In obedience to the request of the Commissioners appointed to consider the best Lines for Railway communications throughout Ireland, conveyed to me in your letter, dated the 19th December, 1836, and to the instructions contained in the same letter, and also to subsequent instructions received by personal communication with the Commissioners themselves, I have proceeded to examine the districts pointed out to me. With especial reference to the important question under consideration, I have to report that the surveys, &c., of the line through the towns required by the Commissioners are entirely completed; that the whole of the lines are laid down in plan and section, on sheets of the Ordnance Map of Ireland. These, together with the description of the Lines which I should recommend to be adopted for Railway communication through the parts specified—of other Lines which, after examination, have been considered unfavourable for this purpose, with the reasons for such an opinion—the lengths and clivities, &c., and the estimates of the cost of execution, I have now the honour of requesting you to lay before the Commissioners.

Previous to entering into detail, it may be satisfactory to state the general result of the examination of the country for the proposed object; which is, that Railway communication may be established between Dublin and Armagh, and between Dublin and Enniskillen, without encountering any engineering difficulties of importance.

According to the instructions I have received, the line of these communications is the same for both transits between Dublin and Navan.

From Navan the Armagh Line would proceed northerly, passing within two miles of Carrickmacross, through Castleblaney, to Armagh. Dublin and Armagh.

And from Navan the Enniskillen Line would proceed north-westerly, through Kells, Virginia, and Cavan, to Enniskillen. Dublin & Enniskillen.

In addition to the inestimable advantages which the Ordnance Map of Ireland affords to the Civil Engineer, I had a tolerably accurate knowledge of the general features of the country through which the proposed Lines of Railway were to be laid out; and, in many of the most important districts, a local knowledge of the probable levels, and the difficulties that were to be encountered, from having been previously employed to lay out and survey several Lines of Railway for different Companies in the northern districts of Ireland, which I will hereafter more particularly advert to. One of these surveys extended from the sea-port of Drogheda, on the east coast, in a northerly direction to Belfast and Armagh, and two others in a westerly direction; one from the same sea-port to the towns of Navan, Kells, Granard, and Longford; and the other from the sea-port of Dundalk to Castleblaney, Ballybay, Cootehill, and Cavan, with branches to Monaghan and Carrickmacross; plans, sections, and reports of which I subsequently had the honour to transmit to the office of the Commissioners. The trial surveys and examinations of the country that were made for these different lines amounted to upwards of 2000 miles, and afforded data and information that were most valuable; much time was thereby saved, which would otherwise have been spent in useless attempts to cross the country in apparently favorable directions, and which nothing but actual levelling could have decided to be impracticable. This follows from the nature of the country, and its geological structure; the latter of which, in many places, is exceedingly embarrassing to the Engineer, who has to determine the proper course of a general line of communication requiring an horizontal or slightly inclined profile; for, besides the great and prominent features of the country as to main ridges and valleys, these are again covered with innumerable smaller hills and basins, so that it is not sufficient here, as in some other parts of the country, to determine the principal passes, in addition to which it requires the labour and patience of ascertaining the proper course over the subordinate hills, in order to attain these main passes in the best manner, and at the least expense. This can only be accomplished with certainty by trial surveys, and rendered absolutely necessary the great extent of levels which I have stated to have been taken for the investigation of the limited district of country which I had to examine (not exceeding 3000 square miles), and which certainly would not have been required in the campaign of either England or Ireland.

Besides this previous information as to levels, which I had acquired in my investigation for private Companies, I had over a considerable portion of the country under consideration,

Appendix A. No. 4.

Report on the North and North-western Lines of Railway.

the important co-operation of Mr. Griffith, one of the Commissioners. His extensive general and local knowledge were eminently useful in this *coup d'œil* of the country. The lines which are sketched in upon the Ordnance Maps, on his suggestion, and with his assistance, were always of very considerable use, and, in many cases, were those which, with some slight deviations, were ultimately adopted.

But for the important aid I thus received from this gentleman, and from the Ordnance Maps, both published and unpublished (for of the latter I was furnished with tracings), I could not have tendered to the Commissioners the information I am about to lay before them, in less than quadruple the time which has elapsed since the receipt of their commands.

Having ascertained, by a careful perambulation, and a comparison of the general levels, the situations that appeared most favorable for lines of the Railway, trial sections were made in these directions, always keeping in view the general principle of carrying the lines in the most direct course possible, between the respective situations pointed out and fixed upon by the Commissioners, and never deviating from it, except to gain the lowest summits or passes through the hills, and the highest points in the valleys; and this, a due regard to economy in the construction of such works renders necessary and advisable. When these trial surveys were laid down they were carefully examined and compared, and the most favorable line adopted. In one or two instances it was necessary to abandon lines previously selected, and to institute fresh surveys and examinations of the country, in order to connect the lines with certain summits which were found indispensable to other parts of the line. In all cases, when the general line was decided on, the whole was relevelled by other parties than those who first made the trial sections, in order to arrive at as much accuracy as the limited time allowed for the survey would admit; the differences in the levels of the extreme points were compared, and errors that might have introduced themselves were, by such comparison and proof, detected. In making these last sections due regard was also had to any minor alteration or improvement that suggested itself, so as to lessen the cuttings or embankments; and although this may not have been carried so far, as on laying out the work for the execution may be found desirable, yet it is hoped, from the great care that was bestowed on this part of the survey, that in the event of the works being proceeded with, none but very trifling alterations will be required. When the levels were thus revised, and a section of the country accurately laid down to a horizontal scale of six inches to the mile, and to a vertical scale of 100 feet to an inch, a series of gradients were chosen, according to principles generally adopted, viz., to obtain or approach as near as practicable to a horizontal line; to have the summits as few and as low as possible; to rise continuously, or, if that be inconvenient, progressively, from the lowest to the highest point, and therefore never to descend whenever it will be necessary to rise again, or *vice versâ*; and finally, if possible, to have no clivities exceeding 16 feet in a mile, or 1 in 330.

On these principles, the estimate I had the honor to submit to the Commissioners in May last, was founded; and though no tunnel, or any very extensive embankments or cuttings, as compared with similar works in England, will be required to follow out the above principles, yet from the undulating nature of the country, and particularly from its separate and detached hills and corresponding basins, which must be cut through and filled up, to prevent sharp curves, a considerable quantity of earth, taken in the aggregate, will require to be removed; though, looking at the required outlay, this, in lines so extensive as those under consideration, may be considered favorable. But being of the opinion that the cost of construction of works of this nature should always be proportioned, as accurately as possible, to the probable traffic of the country; and fearing that this traffic might not warrant such an expenditure as the above would demand, I have assumed and laid down a second series of gradients which are steeper than the first, and the effect of which will be to reduce the items of expense in the land, earth-work, and masonry; but, necessarily, on the other hand, increase the cost of working the line.

The maximum gradient of the first system is, as stated above, 16 feet in a mile, or 1 in 330, except in a single instance, for a length of eight miles, in which the gradient is about 17 feet in a mile, or 1 in 308. That of the second system is about 29 feet in a mile, or 1 in 180, which, I conceive, should never be exceeded except in extreme cases. In some Railway works already commenced, and in others about to be undertaken under my direction, both in Scotland and Ireland, I have recommended this gradient, and in extreme cases, for short distances, even as high as 41 feet in a mile, or 1 in 130. By this means I have been enabled to avoid high embankments and deep cuttings, and effect a very considerable economy in earth-work and masonry. The same gradient has also been adopted in Railways in England, without producing any serious inconvenience, and it is my opinion, that it may be considered as probably sufficient for any Railway in Ireland. In order to exhibit it on the lines under consideration, I have laid down the line to a smaller scale to the preceding sections; viz., one inch to a mile, for the horizontal scale, and 200 feet to an inch for the vertical scale. I have taken the same datum line as in the others, and marked the new clivities which the steeper gradients produce. These clivities, as well as those of the first, I have collected into tables, and given with them references to the particular plan and section on which the first system of gradients appears.

From these data, the steeper gradients may be laid down on the same plans and sections, and their effect on the roads, rivers, &c., which cross the line, be ascertained. The earth-work to be removed, on this system, may also be calculated from them, and compared with that of the first series. This I have done, and tabulated in the Notes A and B, pages 60 and 62, to this Report, and the saving that may be effected in the first cost of construction, by adopting these steeper gradients in preference to others, may be seen by a comparison of the estimates I have given for each supposition. But I must beg leave to repeat, that previously to finally determining the gradient which shall be adopted, in actual execution, the expense of construction, and the probable traffic on the lines, should be carefully proportioned to each other; it being evident that a case might arise, in which a considerable income would justify such an outlay of capital as would be ruinous in a small one.

The drawings, &c., which have been made from the surveys, I have classed in books, under their respective lines. The three relating to the Dublin-Armagh Line are marked A 1, A 2, A 3. Those belonging to the Dublin-Enniskillen Line, B 1, B 2, B 3.

The two books marked A 1, B 1, contain the Plans; they include all the lines surveyed, both those recommended for adoption, and also the trial lines; those which, after survey and comparison, were found inferior to the selected lines, and were rejected as unfit.

The Railway line recommended is strongly marked on the Plans.

All are laid down on engraved sheets of the Ordnance Maps to the six inch scale, from which the Plans sent have been reduced to a scale of one inch to a mile.

The two Books marked A 2, B 2, contain sections, but of those lines only which I have recommended for adoption. These, also, are drawn to two scales; viz., one of which is small enough to exhibit a whole line at one view, serving as an index to the others, which are to the scale of the Ordnance General Map; viz., six inches to a mile.

The two Books marked A 3, B 3, contain the sections of the trial lines only. These are numbered, and colored green, blue, &c., to correspond with their respective Plans in the Books A I, B I. These may, perhaps, be considered at present as of minor importance, but their preservation may save future expense, and assist in estimating the merits of any proposed deviation from the lines now recommended, which future experience or circumstances may bring under discussion.

From the preceding documents, plans and sections have been engraved, and it is to these engravings only that reference will be made in the following part of this Report. The plans consist of sheets of plates, including the Index Map, and form the second part of the Book of Plans. The Sections consist of 36 sheets, including the Clivity Diagrams and their Indexes; and form the second part of the Book of Sections.

It must be observed, that in all the sections of six inches to a mile, the first series of gradients alone is laid down; and that the steeper, or second series, is confined to the Clivity Diagrams, on pages 33 and 34 of the above Second Report.

It may be proper here to state, that I have laid down all the sections to the same datum line, and that I have assumed for this the level of low water adopted by Colonel Colby in the Ordnance Survey in Ireland. I would here, also, take the liberty of suggesting, for the consideration of the Commissioners, a recommendation to the Legislature, that in all Parliamentary Surveys, plans and sections for intended works, public and private, in Ireland, the adoption in future of the scale on which the Ordnance Maps of Ireland are laid down to; that is, of six inches to a mile; that all levels should be referred to the same datum; and that no other be permitted, as far as relates to that country. If this were always done, most of the inaccuracies arising from reduction would be avoided; the expense of laying down surveys would be diminished; all the plans and sections for contemplated works would be on a uniform and intelligible scale. The eye would become accustomed to it, and would, in a great measure, be able to judge of the different works, and compare one with another without the constant application of the scale and compass, which is now necessary to reconcile the various dimensions which are adopted; besides, it would lead to much useful information both to the engineer, the geologist, and the statistical engineer, that all plans and drawings which require levels should be referred to one common standard or datum, for affording the best means of comparison.

The following arrangement will be found useful in referring to the Plans or Sections :—

PLANS.

Plans.

Part 2. INDEX MAP, reduced from the Ordnance Index Maps, to a scale of 4 miles to 1 inch, showing the General Lines of Railway from Dublin to Armagh and Enniskillen, and the intermediate country.

Part 2, Plan 1, Dublin to Navan, Main Trunk for the Armagh and Enniskillen Lines.

Part 2, Plan 2,	Navan, Drumcondra, Carrickmacross, Castleblaney,	Dublin-Armagh Line.
Part 2, Plan 3,	Castleblaney, Milltown, Middletown, Armagh,	
Part 2, Plan 4,	Navan, Kells, Virginia, Near to Cavan,	Dublin-Enniskillen Line.
Part 2, Plan 5,	Cavan, Newtown-Butler, Lisnaskea, Maguire's-Bridge, Enniskillen,	

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Report on the North and North-western Lines of Railway.
Sections.

SECTIONS.

Part 2, Plate 3,	Diagram of Clivities, and Index to Sections, Dublin to Armagh.	
,, 4, ,, 5, ,, 6. ,, 7, ,, 8,	Sections, Dublin to Navan, - -	Main Trunk for Armagh and Enniskillen Lines.
Part 2, Plates 9, ,, 10, ,, 11, ,, 12,	Sections, Navan to Carrickmacross,	Dublin-Armagh Line.
Part 2, Plates 13, ,, 14, ,, 15,	Sections, Carrickmacross to Castleblaney,	
Part 2, Plates 16, ,, 17, ,, 18,	Sections, Castleblaney to Armagh,	
Part 2, Plate 20,	Diagram of Clivities, and Index to Sections, Navan to Enniskillen.	
Part 2, Plates 21, ,, 22,	Sections, Navan to Kells,	Dublin-Enniskillen Line.
Part 2, Plates 23, ,, 24,	Sections, Kells to Virginia.	
Part 2, Plates 25, ,, 26, ,, 27,	Sections, Virginia to Cavan.	
Part 2, Plates 28, ,, 29, ,, 30,	Sections, Cavan to Newtown-Butler.	
Part 2, Plate 31,	Sections, Newtown-Butler to Lisnaskea.	
Part 2, Plate 32,	Sections, Lisnaskea to Enniskillen.	
Part 2, Plate 33,	Clivity Diagram—second Series of Gradients,	Dublin-Navan-Armagh.
Part 2, Plate 34,	Do. Do Do.	Navan-Enniskillen.

In the above drawings will be found all the Railway Lines under consideration, laid down in the usual manner. The plan and the section are therefore necessarily detached from each other, their union or comparison is consequently always a process of some labour and time; and, even in cases where considerable trouble has been taken, is sometimes inaccurately accomplished; or, which is nearly the same thing, not accomplished free from all suspicion of error.

The strong line on these plans represents, as usual, the position of the proposed Railway line upon the ground; but, in addition, I have considered it to represent a vertical section of the rail, and in order to exhibit the relations of the rail line to the existing surface, I have laid down upon it a vertical section of the ground, keeping the surface line above or below the Railway line, according as it rises above or falls below the latter, precisely as is done in the usual detached section.

The parts which are found above the Railway line, are shaded in faint vertical lines; and those below it in strong horizontal lines; where the ground surface line coincides with the Railway line, then, of course, no shading is applied; the small figures show the depths in feet of the cuttings and embankments.

A line illustrated in this manner, will, in a single glance, establish its usefulness. The character of the surface in the direction of the Railway is at once evident; its elevations, depressions, and levels, at whatever height, are instantly seen, and in their exact positions. If cuttings or tunnellings be necessary, a dotted line marks their situation and extent; and any embankments which may be required, are as accurately depicted by the shading. No measurement or estimate is necessary to determine the position of a required point on the Plan corresponding to any given point on the Section, and *vice versâ*; they are here, as in nature, in intimate union, and their peculiar combination, or relation, can be instantly and accurately decided upon. In the engraved plans the sections have been laid down on this principle, to correspond and illustrate the more desirable line of gradients only.

During the short interval of experience since I adopted this mode, I have met with in my own practice, and have received from several professional brethren, such evidence of its utility, that I not only trust the Commissioners will excuse my having introduced it into these Surveys, but that they will do me the honour of examining into its merits, and if they find it possesses the convenience, accuracy, and utility which I have attributed to it, they will be pleased to sanction it with their approbation.

The lines recommended to be adopted for the connexion of Dublin with the distant

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towns of Armagh and Enniskillen, both pass through the town of Navan, I have designated them,

1. The Dublin-(Navan)-Armagh line.*
2. The Dublin-(Navan)-Enniskillen line.

I shall now proceed to describe their routes, lengths, clivities, estimates, costs, &c.

DUBLIN-(NAVAN)-ARMAGH LINE.

Plans, Part 2, Plates 1, 2, 3.

Dublin and Armagh Line. Part 2. Plates 1, 2, 3.

As time did not permit me to ascertain and compare all the numerous and conflicting circumstances which enter into the determination of the most preferable site for the entry and terminus of a Railway, at so important a place as Dublin, I selected a point which involved little or no discussion, and from which, if it should ultimately be considered, as it probably will be, too far from the centre of the city, there would be no difficulty in advancing nearer; or it might be connected by branches with more than one entry and terminus in the city and its environs, if such should be better adapted to the several articles of transport.

The point I start from, and which I consider to possess the condition above mentioned, is situated near the Cross Guns, on the north side of the Royal Canal, adjoining the Botanic Garden.

It is evident, on reference to the dotted line on the plan, that from this point the line may be advanced to the waste ground in the neighbourhood of St. George's church, Dorset-street.†

At the Cross Guns the ground surface is about 88 feet above low water mark, and an embankment of 18 feet will be necessary, according to the first series of gradients that I have chosen; but should it be found advisable to adopt the second series, then this embankment may be much less.

From the Cross Guns the line runs close and nearly parallel to the Royal Canal, and within half a mile south of the Dublin Hill Brook, in the parish of Castleknock; it then runs northerly, and crossing the valley of the Tolka, runs along the north side of that stream, to near Mulhuddart bridge, about a mile and a half west of the bridge, there enters the county Meath, a little beyond the seventh mile from Dublin, in a ten feet cutting, in the townland of Gunnocks. It continues in the same direction, and passes into Mayne, where it bends in a gentle curve towards the north-west, and passes through Norman's Grove, then north-west of Wood Park, and between the Black Bull and Piercetown cottage, through Quarryland to Rathbeggan, a distance of about 12¼ miles from Dublin, where the summit of the country (2,846 feet above the datum line of low water,) is attained by a uniform acclivity from the Botanic Garden to this spot, of 14½ feet in a mile, or 1 in 364.

From Rathbeggan the line continues over the table land which separates the valley of the Liffey from that of the Blackwater and the Boyne, for a distance of about 6¼ miles; passes through Leshemstown, and Calvertstown, and about 1½ mile to the westward of Dunshaughlin, and near Dunsany Castle to the westward, to the public road near the Roman Catholic Chapel.

From Rathbeggan to this point the line is nearly straight, it then curves in nearly a northerly direction, descending 1 in 352, or 15 feet in a mile, to the valley of the Boyne; and passes about one mile to the west of Tara, near to the ruins of Castletown, and a little to the eastward of Dowdston House; it then curves in a north-west direction, and running nearly parallel and close to the river Boyne from Ardsallagh House to Kilcarn, crosses that river at a bend in it, nearly at right angles, and at a height of about 57 feet above ordinary floods. The distance from Dublin to this point of the line is 26 miles, and its height above the datum line of low water 184 feet. From the Roman Catholic Chapel to the same point, is a uniform declivity of 15 feet in a mile, or 1 in 352. After crossing the Boyne, the line continues in the same direction, and with the same rate of declivity, to the Lime Kiln Hill, about one mile further. Here the inclination changes to the horizontal, and so continues for about a mile to the town of Navan, a distance of 27 miles 1,276 yards from Dublin. This horizontal plain is 167 feet above the datum line, and sufficiently high (varying from 10 to 20 feet above the surface of the ground) to allow a free passage under it; and is favourable not only as a terminus and depôt for the town of Navan, but also for the branching off of the two main lines, Armagh and Enniskillen.

These I will now proceed to describe, commencing with the line to Armagh.

NAVAN TO ARMAGH.

Navan to Armagh.

This line commences, as already stated, about midway between the 27th and 28th mile from Dublin, and about half a mile west of the town of Navan, on a ten feet embankment, at a point which is 167 feet above the datum line, and 61 feet above the terminus at the Cross Guns, near Dublin. The first portion of the line is horizontal, and sweeps round

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* This title distinguishes it from the Dublin-Armagh line, which I surveyed last year for a Company, and which is proposed to pass throughout Drogheda, Dundalk, and Newry.

† This line I have subsequently surveyed, and found practicable.

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Navan to Armagh.

the west side of the town in a curve of about three-fourths of a mile radius, and at about a quarter of a mile distant from the Market-place crosses one of the streets and the road to Kells. The line then rises and takes a northerly course through the Abbey lands, and crosses the Blackwater river near the old distillery, at an elevation of 57 feet above ordinary floods, in a very favourable situation, as the line runs nearly at right angles to the stream, and at a point where there are high banks which approach within 150 yards of each other. The ground appears firm, and suitable for building upon, though no borings were made to ascertain the precise nature of the soil. After crossing the river, it runs in nearly a northern direction through Donaghmore, between Symondstown and Proudstown; after which it curves gently towards the north-west, through Sillough, Moortown, Tankardrath, and other townlands in Kilberry parish; and again to the northward, until it arrives at the village of Wilkinstown, 34 miles from Dublin; it then curves to the north-east to near the village of Irishford, 36 miles from Dublin. At this point it has gained the summit of the country lying to the northward of the Valley of the Blackwater and the Boyne, and which, according to my levels, is 247 feet above the datum line, and 80 feet above the terminus at Navan. From the Kells road at Navan, to this point, is a uniform acclivity of about 10 feet per mile, or 1 in 537. From Irishford the line passes in a north-east direction, close to the Cross of Knock, and Killery Bridge, through Mitchelstown and Killery parishes, and about a mile to the westward of Parsonstown House; it then curves to the northward, close to the village of Syddan, 195 feet above the datum line. It then continues in a northerly direction, crossing the river midway between Wooden Bridge and Yellowford Bridge, westward of Aclare House, to the village of Drumcondra, passing through Newstown and Bresslingstown, to the townland of Crowmartin, in the county of Louth, a small portion of which it crosses, and then enters the county Monaghan, near Lagan Bridge: thence passing eastward of Coolderry House, it runs in a north-west direction to Mullyore, a distance of about 48 miles from Dublin, and 160 feet above the datum line. From Aclare House to Mullyore the line has a continued level. From this point a branch might be made to Carrickmacross, which lies to the north-west of the main line, and about 3½ miles distant from it. Various attempts were made, as will be seen by a reference to the plan No. 2, Part 2, to approach nearer to this important agricultural town; but, from its low situation, compared with that of Castleblaney, through which it was required that the main line should pass, it was found impracticable to carry a satisfactory line, which should have the same favourable gradients as those attainable on all the other parts of the line between Dublin and Armagh, nearer than the line on the plan. Should, however, the first series of gradients be abandoned, and the steeper and undulating ones of the second series be adopted, it is possible that the line may be brought something nearer this town, and the trial lines and sections which have been furnished to the Commissioners may then be of essential service in pointing out how that may be accomplished.

From Mullyore, in the county of Monaghan, it was found necessary, in consequence of the high ground which lies between Carrickmacross and Castleblaney, to carry the line considerably to the eastward of the direct course, so as to get into the valley of the Fane; it is on this account that the line curves to the north-east, near the 49th mile, and after passing to the eastward of Tullyallen lough, through Corkeeran, Clonturk, Drumturk, Lisnathannagh, Ballymackney, Coolreagh, and Stradeen, it arrives at Garlegobban, where it is 185 feet above the datum line, and at the extreme eastern point between Navan and Castleblaney. From Mullyore to Garlegobban is an acclivity of 6 feet per mile, or 1 in 852. Here it curves to the north, and passing through Dunelly, Killybeg, Drumganney, and along Kilmurry lough, through Corcullonglish, it runs close to the river Fane, continuing the same course through Ardkirk and Gorteens to Coolskeagh, in the Muckno valley, along the south side of the road from Dundalk to Castleblaney, which it passes close on the south; at this point the line is 348 feet above the datum line, and from Garlegobban it is an acclivity of 7¼ feet in a mile, or 1 in 720. After crossing the road to Ballybay, the acclivity becomes 2½ feet per mile, or 1 in 2,091, nearly equal to a level for a distance of a mile and a quarter.

This part of the line, 350 feet above the datum line, and 65 miles from Dublin, and as it runs nearly on the surface of the ground, it would be a favourable situation for a depot or station for the trade of Castleblaney, and might be joined to the line of Railway I laid out from Dundalk to Ballibay, for which a Bill was procured in the last session of Parliament, and which approaches very close to this point.

From Castleblaney to Armagh a very direct course of Railway is impossible, in consequence of high ground, which, in fact, is a continuation of the mountainous range which extends from Newry in a westerly direction towards Monaghan; and which, even at Keady, situate in the direct line between Castleblaney and Armagh, and about half-way between each, is of considerable elevation, and tails out very gradually towards Monaghan and Ballibay; it therefore became absolutely necessary to make a considerable circuit towards Monaghan to attain a point sufficiently low to carry a line of Railway over it. By reference to Plan No. 3, part 2, it will be seen that this deviation amounted to nearly 6 miles from the direct course, and even then the elevation was greater than on any other part of the line from Dublin, being 409 feet above the datum. Considerable care was taken, and a great deal of labour bestowed on this part of the survey, to ascertain if there was any Pass in the range of hills that would enable a line to be carried nearer to Keady, or in a more direct course, and to fix upon that point which I considered as a just limit between distance and elevation. The various trial surveys which were made for this purpose have not been sent to the Commissioners, as they were made in detached pieces, and merely connected by a series of levels, in many places without lineal measurements,

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Navan to Armagh.

and though sufficient for an Engineer to reason upon, would not be suitable to engrave upon a plan. After skirting close along the west side of the town of Castleblaney, as already described, the line continues in a north-west direction close to the Monaghan road, passing south-west of Drumillard lough, and to the north-east of Laragh and Cremartin loughs, up the valley of a stream, to a point about a mile beyond the latter lough, in the townland of Cornamacklough, where it attains the highest summit at 69 miles from Dublin, being at 409¼ feet above the datum line, and 303 feet above the terminus at Dublin, and 239 feet above the terminus at Armagh.

This summit is attained at one uniform rate of acclivity from Castleblaney, of 15 feet in a mile, or 1 in 359, and the descent from the same point to Armagh is also a uniform declivity of the same rate and number of feet per mile. From Cremartin's lough the line curves to the northward to Milltown, and then inclining to the north-east, at Bryanlitter, to gain high ground, it again curves towards the north-west, and leaving Castle-shane on the west, passes through the townlands of Feddans, Cornahoe, and Drumneill, and enters the county of Armagh in the townland of Skerries. From this it curves to the north-east, passing about one and a half mile to the south-east of Middleton, between Doogary lough and Portmilligan, half a mile north-west of Morton's Cross; then running through Dernalea, Cormeen, Ballycoffey, close to Abbey Park, Ballycrummy Distillery, St. Patrick's Well, the south-west angle of Pentonville Nursery, terminates near the shambles in the north part of the city of Armagh, on a 15 feet embankment, the ground at that point being 154 feet above the datum line, and 85½ miles from Dublin, by the route which I have just described. This terminus appears to possess all the advantages that can be desired; it is sufficiently close to the town, without being a nuisance; no house property will be required; the situation is well adapted for a depôt and stores, and the line may be hereafter carried forward to Coleraine, or joined to the Ulster Railway, as the levels are suitable for both these objects. A branch might also be carried from the neighbourhood of Milltown to Castle-shane and Monaghan, the latter of which is not more than 5½ miles from the line; and as the gradient need not be so perfect on short and local branches as on main or trunk lines, the expense would be inconsiderable in carrying it into execution.

DUBLIN-(NAVAN)-ENNISKILLEN LINE.

Plans, Part 2, Plates 4 and 5.

Dublin-Enniskillen Line.
Part 2.
Plates 4 & 5.

The Dublin-Navan part of this line has been already described in the Dublin-(Navan)-Armagh Line.

At Navan the line turns towards the west in a gentle curve, and running in a north-west direction along the valley of the Blackwater river, and nearly parallel to it, and on the south side of the road from Navan to Kells, passing through the town parks south of Navan, Moate, and near to Mountwhistle; a distance of about one mile and a half from Navan, which is level, being 167 feet above the datum line. From this point the line continues along the south side of the Kells road, passing through Liscartin to near the village of Tankardstown, the acclivity being 7 feet in a mile, or 1 in 736, the height above the datum line being 182½ feet. From Tankardstown the line continues in a north-west direction, passing through Castlemartin to Ballybeg on a level; at this place the direction becomes more northerly, and the line passes through Nugentstown, Cookstown, and Gardenrath, to the town of Kells, which it approaches on the south side to within a quarter of a mile of the market-cross without interfering with a single house, and in a situation most favorable for a depôt or station. The acclivity to this point is 13¼ feet in a mile, or 1 in 382. The height of this point above the datum line being 221⅓ feet, and 57 feet above the station at Navan, the distance from which is 9¾ miles, and from Dublin about 38¼ miles. The ground from Navan to Kells is so favourable for a line of Railway that the rates of acclivity need not exceed 13¾ feet per mile, or 1 in 382, in the steepest place, and that for three miles only, the remainder of the distance being nearly horizontal. From Kells, after passing along the south side of the town, the line continues in a north-west direction along the valley of the Blackwater, and skirting the side of the hills on the south side of the river, passes 350 yards to the north of the Pillar of Lloyd; half a mile beyond which it crosses the Blackwater river near Clevan's bridge. The acclivity from Kells to this point is 11¾ feet in a mile, or 1 in 449, and the height above the datum 248 feet. At the point where the river is crossed there will be an embankment required of 35 feet. From this it passes through the townlands of Meenlagh and Carnacross, where it twice crosses the river Blackwater, at the loop or bend which surrounds the east side of the townlands of Woodpole: this requires two bridges and an embankment, 38 feet in one place, and 40 feet in another. Should the gradients be diminished, as given in the diagram sections, the expense at this point will be a good deal lessened. From hence the line continues on the south side of the river, and runs parallel to the road, and about 200 yards from it to the boundary of the county of Cavan, which it enters near the cross roads of Whitegate in Edinburt. It then runs on the south side of the Dublin and Kells road, and about 300 yards from it to the south angle of Lough Ramor in Stramatt, the acclivity being 13 feet in a mile, or 1 in 412; it then curves gently towards the north, and crossing the mail-coach road near the chapel in Pollintemple, it again turns towards the north-west, and running parallel to the lough, it reaches a point on the north side of, and about 200 yards from the town of Virginia; the rate of acclivity being nearly 2 feet per mile, or 1 in 2,532; where it is 334 feet above the datum line, and about 21 miles from Navan, and

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Dublin-Enniskillen Line.

$48\frac{1}{4}$ from Dublin. The situation here is favorable for a depôt and station, which can be formed without inconvenience, or injury to private property.

From Virginia the line continues in the same direction to Carnaslieve, where it crosses the road; it then runs along the line of the mail coach road to Fintavin; here it curves towards the west, and passing close to the eastern angle of Lough Nathreegeelagh, it inclines more northerly, and passes through Pottle near Pallatree Fort to Ranevogue, the acclivity being 8 feet in a mile, or 1 in 660, where it attains the summit of the country between Virginia and Cavan, which is 400 feet above the datum line, 30 miles from Navan, and 50 from Dublin. From this point it runs in nearly a straight line to Aghadreenagh, with a declivity of $1\frac{1}{4}$ foot per mile, or 1 in 4,320. It then runs in a straight line to the Fort at Corrawellan, about one-fourth of a mile to the east of the Catholic Chapel; the declivity being 15 feet in a mile, or one in 353; here it again inclines to the westward until it reaches the Old Church of Annageliff, where it curves to the northward, and passes along the high land on the north-east side of the town of Cavan, to a point where it crosses the old road from Cavan to Ballyhase in the townland of Kinny-pottle, near which the station or depôt should be situated. The distance from Navan to this point is $39\frac{1}{2}$ miles, and from Dublin about $67\frac{1}{4}$ miles; the declivity being 15 feet in a mile, or 1 in 353; the height above the datum line being 278 feet.

The line of Railway which I surveyed from Dundalk to Cavan might join the Main Line near this point, and would thus open a communication to Cootehill and Ballyhay, and the districts lying between these towns. The line which has just been described, between Virginia and Cavan, passes within ten miles of Ballyjamesduff in the west, and Stradone in the east, to either of which towns branches might easily be laid, should they be required.

From Cavan, after passing along the east side of the town, at a distance of 300 or 400 yards from it, as already described, its direction becomes nearly due north, and running in nearly the line of the mail coach road; and, a short distance from it, it passes along the east side of Drumelagh Lough, through Drumgallagh and Drumaturk, and over the river Erne, or Annalre, about half a mile to the eastward of Butler's-bridge, at a point which, although otherwise favourable, requires a high embankment of from 60 to 70 feet. From the river Erne the line continues in the same direction along the east side of Castle Sanderson Demesne, to the Enniskillen road, near Drumbeghanah, where the height of the ground is 155 feet above the datum line. Near this point, it enters the county of Fermanagh, at the quarry, near Lough Bane; it then curves a little to the westward, through Annaghamore, and crosses the river Finn at right angles to the stream, at a point that will require from 15 to 20 feet embanking. After crossing the river, it inclines more towards the west, and passes close towards the east angle of Kilgarrow Lough, and Spectacle Lough, to Starraghan, on a level; it then skirts the western side of Lough Nacallagh, passes about three quarters of a mile to the westward of Newtown-Butler, and running near the mail coach road, on the east side, to near the School House, Drumgoland, rising at the rate of $3\frac{1}{10}$th feet per mile, or at 1 in 1715. It then runs level, and in a north-west direction, to Gorroroosky, where it crosses the mail coach road, in a 26 feet cutting; it then passes through Culbordia, Drumhose, a little to the east of St. Ronan's Stone, and the ruins of Aghalurcher Church, to the east angle of Lough Head, in Castle Balfour Demesne; it then curves gently towards the north-west, passing about half a mile to the westward of Lisnaskea, and continuing in a north-westerly direction it again crosses the mail coach road, at Oghill; from this it passes through Oghill, and Mullynascarty, and crosses the Colebrook river, nearly at right angles to the stream, in the townland of Aghinure, in a 16 feet embankment. This point of the line is about $1\frac{3}{4}$ mile from Maguire's-Bridge, to which a county road now leads, in a direct course, along the northern bank of the river. Where the line crosses the river, it is $60\frac{1}{2}$ miles from Navan, and $83\frac{1}{4}$ from Dublin; the height above the datum line being 185 feet. After crossing the river, the line continues in the same direction; and passing close to Lough Corban, at a rate of acclivity of 6 feet in a mile, or 1 in 868, it then passes through Whiningan Glebe, Drumrainy, and runs level along the northern extremity of Tamlaght Bay, to Castlecoote Demesne, which it passes on the west, between the mail coach road and the Lough, and terminates in the Fair Green in Enniskillen, on an embankment, 15 feet above the ground, which is here 181 feet above the datum, $68\frac{1}{4}$ miles from Navan, and 96 from Dublin. At Whinnigan, the line is about $1\frac{1}{2}$ mile from Lisbellew, to which an easy access might be made; there is now a good county road which would communicate with the line near the Sandstone Quarry.

Terminus.

The terminus above described, is in a most favourable situation, and is raised on an embankment, for the purpose of crossing the roads, and giving free access to the town, for the country lying east of it, which might otherwise be put to inconvenience or expense, in the event of new lines of road being hereafter required to be made. It has also another advantage, that the line may be continued with more facility and with better gradients, in a northerly direction towards Derry, which I ascertained before I finally determined upon the position of the terminus. It is also well situated for the town, and will not require the removal of a single house, or injure one, except Fair View, near the gaol.

In the foregoing description, the given heights above the datum line are those of the most desirable system of gradients; but, should the others be preferred, they will be found in the following tables, in which are given the length, clivities, &c. of each line, formed on both systems; and as the lines are the same for each system, it would be mere loss of time to describe them again.

Before referring to these tables, however, it may be satisfactory to know the general estimate of the expense of constructing the lines, according to both systems of gradients.

For this purpose I have prepared the following abstract from the detailed estimates of each line, as given in the Notes.

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Abstract of Estimates.

ABSTRACT OF ESTIMATES.

The following Estimate of Cost is so divided, that the Expense of the Works on any Line between two principal Towns may be seen at once.

ESTIMATE of the COST of completing each LINE according to each SERIES of GRADIENTS.

	Dist.	Maximum Gradient not exceeding 1 in 308. £	s.	d.	Average per Mile.	Maximum Gradient not exceeding 1 in 180. £	s.	d.	Average per Mile.
Dublin to Navan, ...	27¾	359,798	6	0	12,966	257,513	13	0	9,280
Navan to Castleblaney, ...	36½	578,766	8	3	15,857	483,402	16	11	13,244
Castleblaney to Armagh, ...	21¼	335,526	16	8	15,784	294,192	4	8	13,844
Dublin to Armagh, ..	85½	1,274,091	10	11	14,901	1,035,108	14	7	12,106
Navan to Kells, ..	9¾	90,085	9	11	9,239	86,281	19	10	8,849
Kells to Virginia, ...	12¼	169,387	10	2	13,550	155,619	11	10¾	12,703
Virginia to Cavan, ...	17½	323,646	1	1	18,494	265,429	13	10	15,167
Cavan to Enniskillen, ..	29	364,327	8	2	12,632	357,886	17	6	12,341
Navan to Enniskillen, ...	68½	947,446	9	4	13,832	865,218	3	0¾	12,630
Dublin to Navan as above, ...	27¾	359,798	6	0		257,513	13	0	
Dublin to Enniskillen, ...	96¼	1,307,244	15	4	13,581	1,122,731	16	0¾	11,664

	£	s.	d.
Cost of Construction, with Gradients not exceeding 1 in 308, ...	£2,221,538	0	3
Stations and Carrying Establishments, ...	114,720	0	0
Total Cost, ...	2,336,258	0	3
Cost of Construction, with Gradients not exceeding 1 in 180, ...	£1,900,326	17	7¾
Stations and Carrying Establishments, ...	114,720	0	0
Total Cost ...	£2,015,046	17	7¾

Tables of Distances and Gradients.

TABLES exhibiting the DISTANCE of each of the principal TOWNS and VILLAGES, and intermediate Points on the Line from DUBLIN, and from each other; the Rates of the Clivities, and the Radii of Quickest Curves; the Heights and Depths of the Greatest Cuttings and Embankings; the Height above Low Water Datum Line, and References of each Point to the Plans and Sections.

DUBLIN TO NAVAN, OR MAIN TRUNK.—No. 1.

Maximum Gradient not exceeding 1 in 364.

Principal Towns, Villages, &c.	Reference to Plans and Sections.		Distance between intermediate Points.		Distance from Dublin.		Difference of Level.		Rate per Mile.	CLIVITIES. Ratio Vertical to Base.		Height above Datum Line of Low Water.		EARTH-WORK. Greatest Height or Depth.		Radii of Quickest Curves.	
	Plan	Section	Mls.	Yds.	Mls.	Yds.	Feet.		Feet.	Acclivity.	Declivity.	Feet.		Cutting.	Embanking.	Mls.	Yds.
DUBLIN, Cross Guns	1	Plate 4	–		–		–		–	–	–	106	0	–	–	–	*
Rathbeggan, nr. Dunshaughlin	1	Plate 6	12	506	12	506	178	6	14½	1 in 364	–	284	6	28	50	1	1,540
Dunsany	1	Plate 7	6	1628	19	374	–		–	–	–	284	6	40	40	1	880
Athlumney	1	Plate 8	7	1474	27	88	117	6	10	–	1 in 522	167	0	33	60	1	400
NAVAN	1	Plate 9	0	1188	27	1276	–		–	–	–	167	0	0	22	1	200

Summit Level Belt.

DUBLIN-ARMAGH LINE.

Maximum Gradient not exceeding 1 in 308.

Principal Towns, Villages, &c.	Reference to Plans and Sections.		Distance between intermediate Points.		Distance from Dublin.		Difference of Level.		Rate per Mile.	CLIVITIES. Ratio Vertical to Base.		Height above Datum Line of Low Water.		EARTH-WORK. Greatest Height or Depth.		Radii of Quickest Curves.	
	Plan.	Section.	Mls.	Yds.	Mls.	Yds.	Feet.		Feet.	Acclivity.	Declivity.	Feet.		Cutting.	Embanking.	Mls.	Yds.
NAVAN		–	–		27	1276	–		–	–	–	–		–	–	–	
Freshford	2	Plate 10	8	330	35	1606	20		9¾	1 in 540	–	147	0	22	30	1	440
Drumcondra		Plate 11	5	1460	41	1306	13		15	–	1 in 353	160	0	50	52	1	880
		Plate 12	6	1320	48	866	–		–	–	–	160	0	50	66	1	440
CARRICKMACROSS		Plate 13	4	55	58	921	25		6⅕	1 in 851	–	185	0	64	61	0	1,320
		Plate 14	8	215	60	1136	139		16½	1 - 308	–	324	0	60	54	3	0
CASTLEBLANEY		Plate 15	3	480	63	1616	24		15¼	1 - 720	–	348	0	45	21	1	0
	3	Plate 15	1	500	65	356	33		2½	1 - 2086	–	351	3	31	27	3	0
		Plate 16	3	1626	69	220	58		14¾	1 - 359	–	409	3	48	53	2	0
		Plate 18	16	460	85	680	239	3	14¾	–	1 in 359	170	0	69	64	1	0
ARMAGH		Plate 18	0	200	85	880	–		–	–	–	170	0		15	–	

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* In the column containing the radii of quickest curves, when no figures are entered, the line of direction is straight.

Appendix A. No. 4.

Report on the North and North-western Lines of Railway.

Tables of Distances and Gradients.

TABLES exhibiting the DISTANCE of each of the principal TOWNS and VILLAGES, and intermediate Points on the Line, from DUBLIN, and from each other; the Rates of the Clivities, and the Radii of Quickest Curves; the Heights and Depths, Greatest Cuttings and Embankings; the Height above Low Water Datum Line, and References of each Point to the Plans and Sections.

DUBLIN-(NAVAN)-ENNISKILLEN.

Maximum Gradient not exceeding 1 in 352.

Principal Towns, Villages, &c.	Reference to Plans and Sections.		Distance between Intermediate Points.		Distance from Dublin.		Difference of Level.		Rate per Mile.		CLIVITIES. Ratio vertical to Base.		Height above Datum Line of Low Water.		EARTH-WORK. Greatest Height or Depth.		Radii of Quickest Curves.	
	Plan	Sections.	Mls.	Yds	Mls.	Yds.	Feet.		Feet.		Acclivity	Declivity.	Feet.		Cutting	Embanking.	Miles.	Yards.
NAVAN -			–		27	1,276	–		–		–	–	–		–	–		–
Newgate Stream	4	21	1	880	29	396	–		–		–	–	167	0	19	12	1	440
			2	286	31	682	–		7	2	1 in 736	–	167	0	13	14	1	1,100
			3	110	34	792	15	0	–		–	–	182	6	18	12	1	0
KELLS -		22	3	66	37	858	42	0	13	8	1 in 382	–	224	6	19	25	1	1,020
			2	00	39	858	23	6	11	8	1 - 449	–	248	0	66	53	1	440
		23	6	220	45	1,078	78	6	12	10	1 - 412	–	326	6	33	38	1	220
VIRGINIA -		24	3	1,474	49	792	8	0	2	0	1 - 2,532	–	334	6	21	27	–	1,100
		25	5	880	54	1,672	43	6	8	0	1 - 660	–	378	0	52	47	1	440
			2	1,170	57	1,082	22	1	8	3	1 - 639	–	400	10	42	39	1	1,300
			1	400	58	1,482	1	7	1	2	–	1 in 4,320	398	6	47	–	1	1,300
CAVAN -	5	26, 27	9	00	67	1,482	135	0	15	0	–	1 - 352	263	6	81	58	1	0
		28	8	180	75	1,662	92	6	11	6	–	1 - 462	171	0	71	68	1	880
		29	2	880	78	782	–		–		–	–	171	0	21	16	1	444
N.T. BUTLER,		30	1	1,670	80	692	6	0	3	1	1 in 1,715	–	177	0	37	11	3	0
		30, 31	7	00	87	692	–		–		–	–	177	0	42	15	1	880
		31	2	1,690	90	622	18	0	6	1	1 - 868	–	195	0	40	26	1	880
ENNISKILLEN		32	5	920	95	1,542	–		–		–	–	195	6	64	30	1	0

DUBLIN TO NAVAN, OR MAIN TRUNK, No. 2.

Maximum Gradients not exceeding 1 in 180.

Principal Towns, Villages, &c.	Reference to Plans and Sections.		Distance between Intermediate Points.		Distance from Dublin.		Difference of Level.	Rate per Mile.		CLIVITIES. Ratio vertical to Base.		Height above Datum Line of Low Water.	EARTH-WORK. Greatest Height or Depth.		Radii of Quickest Curves.	
	Plan	Sections.	Mls.	Yds	Mls.	Yds.	Feet.	Feet.		Acclivity	Declivity	Feet.	Cutting.	Embanking.	Miles.	Yards
		–	–		–		–	–		–	–	106	–	–		–
DUBLIN -	4	4	2	1,340	–		26	9	5	1 in 555	–	132	6	35	5	0
Cross Guns -		4	2	1,040	5	620	67	26	4	1 - 200	–	199	24	24	1	1,600
		5	1	1,140	7	–	13	8	0	1 - 660	–	212	17	17	1	1,320
		5	1	–	8	–	22	22	0	1 - 240	–	234	6	5		–
		5	3	–	11	–	31	10	3	1 - 510	–	265	9	7	1	1,540
		6	3	1,470	14	1,470	50	13	3	1 - 396	–	315	16	18		–
		6	1	–	15	1,470	9	8	9	–	1 in 880	316	6	2		–
		6	0	1,500	16	1,210	22	14	4	–	1 – 366	284	27	–	1	1,600
		7	1	550	18	–	22	16	–	–	1 – 330	262	1	4	1	880
		7	1	1,440	19	1,440	35	16	–	1 in 330	–	297	8	14		–
		7	0	1,080	20	760	6	7	5	–	1 in 705	291	10	4	1	400
		7	1	1,630	22	630	54	28		–	1 – 187	237	25	10	1	1,320
		8	1	660	23	1,296	37	27	3	–	1 – 193	200	16	46	1	120
		8	1	40	24	1,336	9	6	8	–	1 – 600	191	34	11	1	880
		8	1	580	26	156	30	22	9	–	1 – 232	161	20	35	1	1,320
		8	0	1,040	26	1,196	10	14	7	1 in 360	–	171	20	–		–
NAVAN -		8	1	80	27	1,276	21	20	–	–	1 in 264	150	6	10	1	200

DUBLIN-ARMAGH LINE.

Maximum Gradient not exceeding 1 in 180.

Principal Towns, Villages, &c.	Reference to Plans and Sections.		Distance between Intermediate Points.		Distance from Dublin.		Difference of Level.	Rate per Mile.		CLIVITIES. Ratio vertical to Base.		Height above Datum Line of Low Water.	EARTH-WORK. Greatest Height or Depth.		Radii of Quickest Curves.	
	Plan	Sections.	Mls.	Yds.	Mls.	Yds.	Feet.	Feet.		Acclivity.	Declivity.	Feet.	Cutting.	Embanking.	Miles.	Yards.
NAVAN -	-	–	–		27	1,276	–	–		–	–	–	–	–		–
	1	8	0	550	28	71	–	–		–	–	150	7	16	1	440
		9	2	150	30	221	55	26	5	1 in 199	–	205	19	40	1	1,600
		9	0	880	30	1,101	10	20	2	–	1 in 261	195	16	5		–
		9	1	1,390	32	731	10	5	6	1 in 936	–	205	14	3	1	880
		9	1	510	33	1,241	20	15	4	1 - 342	–	225	7	6	1	880
	2	10	2	470	35	1,711	35	15	3	1 - 344	–	260	9	10	1	880
		10	2	20	37	1,731	32	16	0	–	1 in 330	228	15	17	1	880
		10	1	715	39	686	38	27	4	–	1 - 193	190	47	9	3	0
		11	1	520	40	1,206	33	25	7	–	1 - 205	157	28	28		–
		11	0	1,130	41	576	9	14	4	1 in 366	–	166	35	29	1	1,600
		11	0	1,450	42	266	12	29	3	1 - 362	–	178	43	12		–
		11	0	1,650	43	156	15	16	0	–	1 in 330	163	46	30	2	0
		11	1	90	44	246	5	4	7	1 in 1110	–	168	33	25	2	0
		11	0	1180	44	1,426	8	11	9	–	1 in 442	160	33	40	1	1,600
		11	0	450	45	116	–	–		–	–	160	27	–	1	440
		12	1	1,550	46	1,666	30	16	9	–	1 in 328	130	20	34	1	445
		12	1	1,070	48	976	46	28	5	1 in 185	–	176	45	34	3	0
CARRICKMACROSS	-	12	1	1,000	50	216	31	20	1	–	1 in 262	145	62	43	0	1,320
		22	0	1,090	50	1,306	9	15	8	1 in 350	–	154	50	3		–

Appendix A. No. 4.

Report on the North and North-western Lines of Railway.

Tables of Distances and Gradients.

TABLE, exhibiting the DISTANCE of each of the principal TOWNS and VILLAGES, and intermediate Points on the Line from DUBLIN, and from each other; the Rates of the Clivities, and the Radii of Quickest Curves; the Heights and Depths, Greatest Cuttings and Embankings; the Height above Low Water Datum Line, and References of each Point to the Plans and Sections.

DUBLIN-ARMAGH LINE.

Maximum Gradient not exceeding 1 in 180.

Principal Towns, Villages, &c.	Reference to Plans and Sections.		Distance between intermediate Points.		Distance from Dublin.		Difference of Level.	Rate per Mile.		CLIVITIES. Ratio vertical to Base.		Height above Datum Line of Low Water.	EARTH-WORK. Greatest Height or Depth.		Radii of Quickest Curves.	
	Plan	Section.	Mls.	Yds.	Mls.	Yds.	Feet.	Feet.		Acclivity.	Declivity.	Feet.	Cutting	Embanking.	Miles.	Yards.
	2	13	1	400	51	1,706	31	25	5	1 in 207	–	185	60	40	1	220
		13	0	960	52	906	15	27	7	–	1 in 190	170	35	36	1	1,100
		13	3	1,600	56	746	112	28	7	1 in 184	–	282	57	54	1	440
		14	1	30	57	776	20	19	5	1 - 270	–	302	26	20	1	0
		14	1	460	58	1,236	22	17	4	1 - 303	–	324	26	26	3	0
		14	0	1,530	59	1,006	10	11	5	–	1 in 459	314	25	26	1	300
		14	1	80	60	1,086	20	19	4	1 in 272	–	334	23	10	3	0
		14	0	1,330	61	656	9	12	1	–	1 in 433	325	26	15	3	0
		14	0	1,280	62	176	7	9	8	–	1 - 535	318	10	6	4	0
		15	0	1,560	62	1,736	17	19	7	1 in 268	–	335	16	15	1	660
CASTLEBLANEY,		15	0	1,480	63	1,456	15	17	6	1 - 300	–	350	33	17	1	0
		15	0	1,170	64	866	2	3	0	1 - 1755	–	352	10	6	3	0
	3	15	1	1,140	66	246	0	–		–	–	352	55	44	2	0
		15	1	1,100	67	1,346	38	23	3	1 in 226	–	390	39	30	2	0
	3	16	0	1,630	68	1,216	18	19	4	1 in 271	–	408	14	15	2	0
		16	0	1,650	69	1,106	18	19	1	1 - 275	–	426	25	15	2	0
		16	2	70	71	1,176	56	28	5	–	1 in 185	370	44	30	1	880
		16	1	330	72	1,506	27	23	0	–	1 - 229	343	40	42	1	880
		16	0	1,040	73	786	0	–		–	–	343	25	50	1	0
		17	5	1,150	79	176	81	14	7	–	1 in 359	262	45	64	2	0
		18	1	470	80	640	22	17	4	–	1 - 303	240	21	24	2	0
		18	0	1,490	81	376	2	2	4	1 in 2,190	–	242	17	20	1	880
		18	1	800	82	1,176	36	24	7	–	1 in 213	206	31	35	1	0
		18	1	650	84	66	36	24	6	–	1 - 214	170	35	20	–	
ARMAGH,		18	1	810	85	880	0	–		–	–	170	50	42	–	

TABLE, exhibiting the distance of each of the principal TOWNS and VILLAGES, and intermediate Points on the Line from DUBLIN, and from each other; the Rates of the Clivities, and the Radii of Quickest Curves; the Heights and Depths, Greatest Cuttings, and Embankings; the Height above Low Water Datum Line, and Reference of each Point to the Plans and Sections.

DUBLIN-ENNISKILLEN LINE.

Maximum Gradient not exceeding 1 in 180.

Principal Towns, Villages, &c.	Reference to Plans and Sections.		Distance between intermediate points.		Distance from Dublin.		Difference of Level.	Rate per Mile.		CLIVITIES Ratio vertical to Base.		Height above Datum Line of Low Water.	EARTH-WORK Greatest Height or Depth.		Radii of Quickest Curves.	
	Plan.	Section.	Mls.	Yds.	Mls.	Yds.	Feet.	Feet.		Acclivity.	Declivity.	Feet.	Cutting.	Embanking.	Miles.	Yards.
NAVAN.	–	–	–	–	27	1,276	–	–		–	–	150	–	–	–	
	4	21	1	1,750	29	1,266	31	15	5	1 in 340	–	181	19	13	1	440
		21	0	1,475	30	981	15	17	7	–	1 in 296	166	10	7	1	1,100
		21	0	1,430	31	651	20	25	1	1 in 210	–	186	11	9	1	1,320
		21	0	1,520	32	411	14	16	5	–	1 in 320	172	16	7	–	
		21	0	1,630	33	281	15	16	5	1 in 320		187	6	6	1	880
	4	22	1	1,230	34	1,511	9	5	3	–	1 in 997	178	19	20	1	1,320
		22	1	25	35	1,576	25	24	1	1 in 219	–	203	11	10	–	
		22	0	960	36	776	4	7	3	1 - 720	–	207	9	3	–	
KELLS.		22	0	1,570	37	586	26	29	1	1 - 181	–	233	9	14	–	
		22	0	380	37	996	–	–		–	–	233	–	15	–	
		22	0	970	38	176	15	27	2	1 in 194	–	248	48	20	1	440
		22	0	1,335	38	1,511	5	6	5	–	1 in 806	243	24	5	1	1,320
	4	23	0	1,060	39	811	15	24	9	–	1 - 214	228	15	30	1	1,320
		23	1	460	40	1,271	32	25	2	1 in 209	–	260	14	33	2	440
		23	0	800	41	311	6	13	2	1 - 400	–	266	15	0	2	440
		23	1	00	42	311	4	4	0	–	1 in 1320	262	20	28	1	1,320
			2	635	44	946	68	28	8	1 in 183	–	330	16	18	2	220

Appendix A. No. 4.

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Tables of Distances and Gradients.

TABLE, exhibiting the DISTANCE of each of the principal TOWNS and VILLAGES, and Intermediate Points on the Line from DUBLIN, and from each other; the Rates of the Clivities, and the Radii of the Quickest Curves; the Heights and Depths, Greatest Cuttings and Embankings; the Height above Low Water Datum Line, and References of each Point to the Plans and Sections.

DUBLIN-ENNISKILLEN LINE—(*continued*).

Maximum Gradient not exceeding 1 in 180.

Principal Towns, Villages, &c.	Reference to Plans and Sections.		Distance between intermediate Points.		Distance from Dublin.		Difference of Level.	Rate per Mile.		Clivities. Ratio to vertical Base.		Height above Datum Line of Low Water.	Earth-work. Greatest Height or Depth.		Radii of Quickest Curves.	
	Plan	Section.	Mls.	Yds.	Mls.	Yds.	Feet.	Feet.		Acclivity.	Declivity.	Feet.	Cutting.	Embanking.	Miles.	Yards.
	4	24	1	790	45	1736	20	13	7	–	1 in 382	310	15	14	1	220
		24	1	210	47	186	30	26	8	1 in 197	–	340	10	9	2	0
		24	0	1010	47	1196	17	29	5	–	1 in 179	323	5	10	0	1,100
		24	0	1510	48	946	19	22	1	1 in 238	–	342	11	11	1	660
VIRGINIA -		24	0	1220	49	406	20	28	8	–	1 in 183	322	20	10	1	660
		24	0	410	49	816	–	–		–	–	322	11	0		–
		24	0	570	49	1386	9	27	7	–	1 in 190	313	1	24	2	0
		24	0	820	50	446	11	23	5	1 in 224	–	324	11	21	2	0
	4	25	0	1240	50	1686	20	28	3	1 - 186	–	344	22	1	1	1,320
		25	0	1463	51	1391	11	13	5	1 - 391	–	355	20	10	3	0
		25	0	1300	52	931	19	25	7	1 - 205	–	374	16	6		–
		25	1	30	53	961	30	29	3	–	1 in 180	344	27	27	1	440
		25	1	40	54	1001	30	29	3	1 in 160	–	374	50	25	3	0
		25	0	990	55	231	16	28	3	–	1 in 186	358	40	28	2	0
		25	0	1425	55	1656	24	28	8	1 in 183	–	382	30	26	2	0
	4	26	0	720	56	616	2	48	0	–	1 in 1050	360	9	32		–
		26	1	620	57	1236	39	28	8	1 in 182	–	419	24	32	1	1,300 } Summit.
		26	0	960	58	456	63	10	7	1 - 490	–	415	5	6		–
		26	2	270	60	726	63	29	1	–	1 in 181	362	24	22		–
		26	1	320	62	1046	24	20	3	–	1 - 260	338	36	20		–
	5	27	1	280	62	1226	34	29	3	1 in 180	1 - 0	372	38	44	1	1,320
		27	1	0	63	1826	25	25	0	–	1 - 211	347	27	34	1	1,320
		27	1	390	64	1716	36	29	3	–	1 - 180	311	46	33	1	0
		27	0	1700	65	1656	9	95	0	–	1 - 566	302	60	27	2	0
		27	0	1460	66	1356	24	28	9	–	1 - 183	278	65	45	1	0
		27	0	500	67	96	0	–		–	–	278	50	–	3	0
		27	0	410	67	506	6	25	7	–	1 in 205	272	0	60	3	0
	5	28	0	1290	68	36	22	27	2	–	1 - 193	252	58	53	1	1,100
		28	0	920	68	956	17	28	7	1 in 164	–	267	44	40		–
CAVAN - -		28	2	1040	71	236	67	26	0	–	1 in 203	200	70	50	0	1,430
		28	0	1320	71	1556	13	17	4	1 in 304	–	213	32	27	1	880
		28	1	160	72	1716	25	22	9	–	1 in 230	188	22	6		–
	5	29	0	400	73	356	6	–		1 in 186	–	194	–	2		–
		29	0	1660	74	256	16	17	0	–	1 in 311	178	51	23	3	0
		29	0	720	74	976	6	14	6	1 in 360	–	184	20	11	3	0
		29	0	1160	75	376	19	28	9	–	1 in 183	165	20	16		–
		29	0	1180	75	1556	18	27	0	1 in 197	–	183	44	19		–
		29	0	1360	76	1156	22	28	8	–	1 in 184	161	46	23	3	0
		29	1	1730	78	1126	2	1	29	1 in 5735	–	163	28	8	1	440
	5	30	0	1480	79	346	11	13	0	1 - ·404	–	174	33	6		–
		30	0	1380	80	466	13	16	6	–	1 in 318	167	35	9	3	0
NEWTOWN-BUTLER	-	30	0	370	80	836	–	–		–	–	167	–	9	1	440
		30	0	1300	81	376	21	28	4	1 in 186	–	188	33	5	1	440
		30	0	500	81	876	7	24	7	–	1 in 214	181	34	22		–
		30	0	640	81	1516	10	27	5	1 in 192	–	191	25	18	2	0
		30	0	710	82	466	11	27	2	–	1 in 194	180	25	17	2	0
		30	0	520	82	986	6	20	3	1 in 260	–	186	14	19		–
		30	0	870	83	96	10	20	3	–	1 in 261	176	19	9	1	880
		30	0	1250	83	1346	6	8	4	–	1 - 625	170	42	18	1	1,320
		30	0	1000	84	566	7	12	3	1 in 426	–	177	20	9	1	1,320
	5	31	0	1300	85	126	10	13	5	1 in 390	–	184	21	9	1	1,320
LISNASKEA, -		31	0	1610	85	1736	18	19	7	–	1 in 268	166	4	5	3	0
		31	1	840	87	816	0	–		–	–	166	12	6	3	0
		31	0	1060	88	116	12	19	9	1 in 265	–	178	15	5	1	880
		31	0	730	88	846	1	2	4	–	1 in 2190	177	9	13		–
		31	0	520	88	1366	8	27	1	1 in 195	–	185	5	9		–
		31	0	700	89	306	8	20	0	–	1 in 263	177	17	14	3	0
		31	0	1480	90	26	15	17	6	1 in 296	–	192	28	26	3	0
	5	32	0	1370	90	1396	3	3	8	1 in 1370	–	195	40	10	2	0
		32	1	0745	92	381	–	–		–	–	195	40	26	3	0
		32	0	1140	92	1521	18	27	7	–	1 in 190	177	22	15		–
		32	0	1020	93	781	17	29	3	1 in 180	–	194	53	19	1	660
ENNISKILLEN		32	2	910	95	1691	–	–		–	–	194	20	30	1	0

Appendix A.
No. 4.

Report on the North and North-western Lines of Railway.

Trial Lines.

TRIAL LINES.

Besides the lines above described and estimated, surveys of several other lines, and many and careful examinations of the country for several miles on each side of the above were made, in order to obtain sufficient data for deciding upon the best. One survey was made in the line between Dublin and Navan, four between Navan and Castleblaney, and several between Castleblaney and Armagh, not inserted on the plans, for reasons before given. Five of the surveys were made on the Dublin-(Navan)-Armagh Line, and eleven on that between Navan and Enniskillen.

The situation of each of these lines, as may be found on the plans, their lengths, the cause of rejection, &c., I have thrown into the two Tables following. On the engraved plans these are represented by dotted lines.

I. DUBLIN-(NAVAN)-ARMAGH LINE.

Books A, I. and III.

Dublin-Armagh Line.

No. on Plans and Sections.	Situation.	Length.		Cause of Rejection.	Color on Plans and Sections.
		Mls.	Chs.		
No. 1	Clonee—Navan - -	19	23	Summit at Ratoath too high -	Green.
„ 2	Castleblaney - Carrickmacross -	17	50	Descent too sudden - -	Brown.
„ 3	Ditto—Ditto - -	20	39	Too low, south-west of Carrickmacross - -	Blue.
„ 4	Intersection of Roads near Mullymore - Monaltyduff - -	2	18	Generally unfavourable -	Green.
„ 5	Syddan—Ardee - -	16	18	Circuitous, and too low at Ardee	Brown.
	Total -	75	48		

II. NAVAN-ENNISKILLEN LINE.

Books B, I. and III.

Navan-Enniskillen Line.

No. on Plans and Sections.	Situation.	Distance.		Cause of Rejection.	Color on Plans and Sections.
		Mls.	Chs.		
No. 1	Kells—Virginia - -	9	61	Too high at Edinburt - -	Black.
„ 2	Kells—Edinburt - -	14	20	Ditto ditto - -	Yellow.
„ 3	Road to Mullagh - Tullygarvey - -	3	37	Too high at Lahyalaghlin -	Blue.
„ 4	Longnathreezeelath - Innishbeg - -	7	0	Too high - - -	Brown.
„ 5	Latologhlan—Aghadreenagh -	1	52	Ditto - - -	Green.
„ 6	Corrawillan Fort - Tullygarvey - -	3	37	Ditto - - -	Purple.
„ 7	Armagilly—Drumgolagh -	2	74	Too low - - -	Brown.
„ 8	Plush—Drumlaney - Lough - -	3	69	Generally unfavourable -	Light Green.
„ 9	Drumboghonagh - Clonarve - -	1	40	Too high - - -	Orange.
„ 10	Keady Lough - Moneymaken - -	3	75	Too high at Lisnaskea -	Black.
„ 11	Farmanallen—Drumarce -	2	11	Generally unfavourable -	—
	Total -	53	76		

From these statements it will be seen, that upwards of 75 lines of trial survey were made on the line between Dublin and Armagh, and 54 on the line between Navan and Enniskillen. After deliberate consideration, I am of opinion, that the lines recommended for adoption, though perhaps not quite perfect in detail, will bear the test of a close and minute examination, and that they are, on the whole, the best that could be found between the several towns pointed out by the Commissioners.

Appendix A. No 4.

Report on the North and North-western Lines of Railway.

Survey of Lines for Private Parties.

LINES SURVEYED IN THE NORTHERN DISTRICTS OF IRELAND FOR OTHER PARTIES THAN THE COMMISSIONERS.

These are—1. Drogbeda, Dundalk, Newry, Armagh;
2. Drogheda, Dundalk, Newry, Banbridge, Belfast;
3. Drogheda, Navan, Longford;*
4. Dundalk, Castleblaney, Cavan, with distinct branches to Monaghan and Carrickmacross.

And as the plans, &c., of the above have been transmitted by me to the Commissioners, I conceive it will not be necessary to enter here into any further description, except merely stating, that the only instance in which any part of these lines coincides with the lines surveyed by the direction of the Commissioners is on that part of the Dublin-(Navan)-Enniskillen Line which lies between Navan and Kells. This section had been previously surveyed, and after a careful and minute examination of the country, selected by me for the Drogheda-Longford Railway Company: every pains had been taken on that survey to obtain the best possible line, and I found, when I went over it a second time for the Commissioners, that improvement upon it was impracticable. On exhibiting the plans and sections of the Drogheda-Longford Line to Mr. Griffith, during my journey with him to the North, I received on the spot his sanction for the adoption of this part of that line, and I have therefore laid it down on the plans prepared for the Commissioners.

Since this last survey was made for the Commissioners, a set of levels have been taken and a section carried forward by me for the same Company, from Kells to Longford, passing close to Granard and Athboy. From this I have ascertained that a line of Railway may be carried from the Navan-Enniskillen Line at Kells to Granard and Longford, the clivities of which need not exceed 17½ feet in a mile, or 1 in 300, with very moderate cuttings and embankments, and therefore the expense of constructing this line would be less than the other portions of the same line.

The Dundalk-Cavan Line simply crosses the Dublin-(Navan)-Armagh Line at Castleblaney, and runs up to the Dublin-(Navan)-Enniskillen Line at Cavan. A portion of this line extending from Dundalk to Ballibay, and on which Castleblaney is situated, received the sanction of Parliament, in the last session, and as it is likely to be carried into effect, the more important articles required for the formation of the Dublin-Armagh Line, such as iron, timber, &c., may be delivered at Castleblaney, and for several miles on each side of it, at much less expense than they could possibly be by the present mode of land carriage, and which will reduce the estimate I have made of the Dublin-(Navan)-Armagh Line.

A similar effect could be produced at Navan and Kells, and in their neighbourhood, if the Act for the proposed Railway from Drogheda to those places, which is now in Parliament, be obtained.

General Observations.

GENERAL OBSERVATIONS.

The estimates have been formed on the supposition that the roadway is to be 30 feet wide at the bottom of the cuttings, and of the same dimensions at the top of the embankings, and that the slopes, both in cuttings and embankings, are to be 2 horizontal to 1 perpendicular, (except through the deep cuttings south of Carrickmacross, which are calculated to stand at 1 to 1,) though, considering the nature of the soils through which the different lines will pass, slopes of 2 to 1 will not, in my opinion, be required throughout; in many cases through the cuttings the soil may stand much more upright; but as rock and loose stones, hard gravel, and other soil expensive to remove, will be found in many of the excavations, I have thought it the safest way to maintain this proportion throughout, and then allow earth prices for the whole, which, I have no doubt, will be sufficient to execute the work; particularly as the earth-work has been calculated from these dimensions, by my Tables, which give generally 15 per cent. more than the common inaccurate mode of calculation.†

In the estimate for ballasting, I have supposed gravel, pebbles, or quarry chips to be used; the ballasting to be 18 inches thick under the Railway, diminishing to 4 at the sides. In all places, however, where good rubble stone can conveniently be had, and which, I believe, will be the case in most parts of the line north of the Boyne, I would recommend that a course of such stones should be laid by hand across the road, firmly packed and wedged together in the form of a compact pavement, the interstices of which should be filled with stone chips or spawls, driven in by means of a hammer; the stones should be placed on their broadest edges, and should be 10 or 12 inches deep; over this sub-pavement 6 or 8 inches of broken stone or gravel should be placed, and well rammed before the blocks or sleepers are laid down. The boxing should be 12 inches deep, and composed of the smallest description of gravel, of which abundance can be procured in most of the districts through which the lines pass. Under the sub-pavement, cross drains, either open or filled with rubble stone, should be made at every 10 or 15 yards, where the soil is at all wet. These drains need not be more than 10 inches deep and 10 inches wide;

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* Though the line is the same, the gradients are different; those on the Drogheda and Longford Line being laid down for horse power only.

† To enable the Commissioners to examine the details of this part of the Estimate, I have sent the Tables of the Original Calculations of the earth-work and the quantity of the land.

they should fall each way from the centre towards the main side drains, the bottom of which should be 10 inches below the level of the lowest side of the ballasting.

The rails are estimated to be wrought iron, and 42 lbs. only to the yard, which, I have no doubt, will be sufficient, either with the continuous bearing suggested by Mr. Nimmo, in his Report on the Limerick and Waterford Railway, in 1826,* or by introducing closer bearings, (say two feet only apart,) which has been found to answer well on some Railways in Scotland; but the mode I should recommend for adoption would be that which I have directed to be used on a Railway in that country; viz., to lay the rails on square stone blocks, in cast-iron chairs, three feet from centre to centre, in the usual manner; each alternate block to be of large dimensions, and placed diagonally, bearing, besides the chair, a cast-iron saddle, laid under the rails near the angles of the blocks, so as to divide the bearing between each pair of chairs into two lengths, and thereby reduce it to at least 18 inches. These saddles are to be fixed to the stone by plugs and spikes, in the usual manner, but they require no protection against lateral strain, the upper surface being merely a ridge without any check or projection, like the chair. In fixing the rails to the chairs, I should recommend that keys or wedges of wood may be dispensed with, and the chairs be cast so as to fit the rail, and be driven on tightly before they are laid down. The plan has been adopted on several Railways in Scotland, and has been found to answer exceedingly well; but as it may still be thought desirable to use wooden keys, I have included them in the estimate.

In designing for the bridges, &c., rubble work and hammered stone masonry have been introduced as much as possible, cut and dressed stone being used only where absolutely necessary. Should severe economy in the first construction be resolved upon, one line of Railway might be laid down, with passing places or double ways between the principal towns or stations; these passing places might not exceed one mile in length, and should be placed in those parts of the line where the trains would pass each other if they were started at the same time from the nearest principal towns; and also in these parts where the trains would pass each other, between the extreme termini; viz., Dublin and Armagh, and Dublin and Enniskillen. In the latter cases the passing places should be five or six miles long, so as to allow amply for such small irregularities in time as may occur on the other parts of the line; by this means, and by judicious and careful management, uninterrupted communications might be maintained between the principal towns and places intermediate, and a reduction effected in the first cost, amounting to £2,400 per mile.

There are already several Railways which have been laid with one line of Railway only, which have suceeded admirably; they are now paying from seven to eight per cent. The rails on these have been laid on one side of the space which had been formed for the double track, and that side only finished up, and its slopes, &c., soiled and levelled; the other side being left unfinished for an indefinite time.

A saving might also be effected in many of the bridges, by introducing timber trussed with wrought iron ties, instead of stone arches—a mode which I have adopted on the Slackmannan Railway; also on that of the Wishaw and Coltness, both of which are in progress, to bridges which have spans of 100 feet. A similar mode might be adopted for crossing the Boyne and Blackwater rivers; and where Railways are carried over turnpike roads a considerable space may thus be afforded at a comparatively small additional expense.

In estimating the earth-works, I have added two feet to the depths shown on the sections in all the cuttings, to allow space for the ballasting and blocks, as the line on the sections represents the surface of the rails when finished.

I have previously noticed the great advantage and facilities afforded by the Maps of the Ordnance Survey of Ireland; and it is a duty I think I owe to the parties who prepared them, to add, that having now had an opportunity of examining and checking them in various directions, and for different works, over an area extending from the east coast to the parallel of Enniskillen on the west; and from Dublin to the extreme cost of Antrim and Derry, on the north; and having had lines of surveys carefully measured by myself and assistants, laid down upon them, to a total amount of more than 4,000 miles, I have in no instance detected any error or inaccuracy. As they contain ample information, laid down on a scale of six inches to a mile, with unrivalled distinctness, they leave scarcely any thing to be desired, either by the topographical surveyor, or the civil engineer, who may be engaged upon ascertaining the best routes of communication.

JOHN MACNEILL.

8th January, 1838.

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* This plan has been lately adopted by several Railway Companies, both in England and Ireland, under the direction of Mr. Vignoles. By the use of the timber baulks, which he uses, I have no doubt that there will be less wear and tear on the road and engines; but I have some doubt as to its durability, and particularly to its applicability, in preference to stone blocks, in many districts of Ireland.

Appendix A.
No. 4.
—
Report on the North and North-Western Lines of Railway.

NOTE A.

ESTIMATE of a LINE of RAILWAY from DUBLIN to ARMAGH, through the TOWNS of NAVAN and CASTLEBLANEY, referring to MAPS, SECTIONS, &c., prepared for the RAILWAY COMMISSION.

CALCULATED FOR LOCOMOTIVE POWER.

Estimates.

Dublin to Navan.

DUBLIN TO NAVAN, 27½ MILES.

Description of Work.	Maximum Gradient not exceeding 1 in 364.				Maximum Gradient not exceeding 1 in 180.			
	Quantities.	Rate.	Amount.	Total.	Quantities.	Rate.	Amount.	Total.
			£ s. d.	£ s. d.			£ s. d.	£ s. d.
EARTH-WORK. Slopes, 2 to 1, & base 30 feet	Cubic Yards. 3,408,554	10*d*.		142,023 1 8	Cub. Yards. 1,470,217	9½*d*.		58,196 1 9½
MASONRY.	No.							
Arches and Tunnels in crossing principal Roads	8	£300	2,400 0 0			£270	2,160 0 0	
Arches and Tunnels in Parish and Bye Roads	29	£200	5,800 0 0			£150	4,351 0 0	
Accommodation Bridges -	54	£100	5,400 0 0			£1,000	5,400 0 0	
Culvert on River Tolka -			300 0 0				240 0 0	
Culverts on Streams, &c. -	16	£140	2,240 0 0			£140	2,240 0 0	
Bridge over River Boyne, near Navan - -			10,000 0 0	26,140 0 0			9,400 0 0	23,791 0 0
Ballasting and Boxing, including forming & levelling, ready for Sleepers.	Cubic Yards. 248,835	3*s*.		37,325 5 0	Cub. Yards. 248,835	3*s*.		37,325 5 0
Wooden Sleepers, 9 feet long - - -	No. 97,372	4*s*.		19,474 8 0	No. 97,372	4*s*.		19,474 8 0
IRON-WORK, &c.								
Rails, say 48,686 lineal yards, laid with four lines of Rails; 192,744 yards, at 42 lbs. per yard - - -	Tons. Cwts. 3,651 9	£12	43,817 8 0		Tons. Cwts. 3,651 9	£12	43,817 8 0	
Chairs, at 14 lbs. each, double at 21 lbs.	Tons. Cwts. 1,338 8	£8	10,707 4 0		Tons. Cwts. 1,338 8	£8	10,707 4 0	
Spikes and Keys, 3 to 1 lb. - - -	1,738	30*s*.	2,607 0 0	57,131 12 0	1,738 0	30*s*.	2,607 0 0	57,131 12 0
Setting Sleepers, fixing Chairs, and laying Rails complete - -	Lineal Yards. 48,686	1*s*. 6*d*.		3,651 9 0	Lineal Yds 48,686	1*s*. 6*d*.		3,651 9 0
Fencing and Draining.	Lineal Yards. 48,686	8*s*.		19,474 8 0	48,686	8*s*.		19,474 8 0
			Carried forward	305,221 3 8			Carried forward	219,044 3 9½
Contingencies, at 10 per cent. - - -	–	–	–	30,522 2 4				21,904 8 4½
Land - - - -	Acres. 346	£70		24,220 0 0	Acres. 239	£70		16,730 0 0
				359,963 6 0				257,678 12 2

Navan to Castleblaney.

NAVAN TO CASTLEBLANEY.

Description of Work.	Maximum Gradient not exceeding 1 in 308.				Maximum Gradient not exceeding 1 in 180.			
	Quantities.	Rate.	Amount.	Total.	Quantities.	Rate.	Amount.	Total.
			£ s. d.	£ s. d.			£ s. d.	£ s. d.
EARTH-WORK. The heavy cutting between Carrickmacross and Castleblaney, calculated at a slope of 1 to 1, - - -	Cubic Yards. 6,461,844	10*d*.		269,243 10 0	Cub. Yards. 4,788,034	9½*d*.		189,526 6 11
MASONRY.	No.				No.			
Arches and Tunnels, for crossing principal roads	15	£300	4,500 0 0		15	£270	4,050 0 0	
Ditto ditto, on Parish and Bye roads - -	32	£200	6,400 0 0		32	£150	4,800 0 0	
Accommodation Bridges,	72	£100	7,200 0 0		72	£100	7,200 0 0	
Culvert on Ballymakenny river -	1		500 0 0					
Culverts on Streams, -	6	£140	840 0 0		6	£130	780 0 0	
Bridge over the Blackwater, near Navan,	1		10,000 0 0				9,500 0 0	
Bridge over river Lagan -	1		800 0 0	30,240 0 0			533 0 0	26,863 0 0
Carried forward -	-	-	-	299,483 10 0	-	-	-	216,389 6 11

Appendix A.
No. 4.

Report on the North and North-western Lines of Railway.

Estimates.

Navan to Castleblaney.

NAVAN TO CASTLEBLANEY—*(continued.)*

Description of Work.	Maximum Gradient not exceeding 1 in 308.				Maximum Gradient not exceeding 1 in 180.			
	Quantities.	Rate.	Amount.	Total.	Quantities.	Rate.	Amount.	Total.
			£ s. d.	£ s. d.			£ s. d.	£ s. d.
Brought forward	-	-	-	299,483 10 0	-	-	-	216,389 6 11
MASONRY.								
Ballasting and Boxing, including levelling, forming Slopes, and laying ready for Blocks on Sleepers	Cubic Yards. 323,983	3s.		48,597 9 0	Cub. Yards. 323,983	3s.		48,597 9 0
Blocks bored and dressed	No. 253,552	3s. 6d.		44,371 12 0	No. 253,552	3s. 6d.		44,371 12 0
IRON-WORK, &c.								
Rails, 253,552 lineal yds., at 42 lbs. per yard	Tons. Cwt. 4,754 2	£12	57,049 4 0		Tons. Cwt. 4,754 2	£12	57,049 4 0	
Chairs, 14 lbs., ½ double at 21 lbs.	1,743 3	£8	13,945 4 0		1,743 3	£8	13,945 4 0	
Spikes and Keys, 3 to 1 lb.	2,263	30s.	3,394 10 0		2,263	30s.	3,394 10 0	
Oak Plugs	No. 507	50s.	1,267 10 0	75,656 8 0	No. 507	50s.	1,267 10 0	75,656 8 0
Setting Blocks, fixing Chairs, and laying Rails, complete	Lineal Yards. 63,388	2s. 6d.	7,923 10 0	7,923 10 0	Lineal Yds. 63,388	2s. 6d.	7,923 10 0	7,923 10 0
Fencing and Draining	63,388	8s.	25,355 4 0	25,355 4 0	63,388	8s.	25,355 4 0	25,355 4 0
				501,387 13 0				418,293 9 11
Contingencies, at 10 per cent.	–	–	–	50,138 15 3				41,829 7 0
Land	Acres. 454	£60		27,240 0 0	Acres. 388	£60		23,280 0 0
				578,766 8 3				483,402 16 11

Castleblaney to Armagh.

CASTLEBLANEY TO ARMAGH.

Description of Work.	Maximum Gradient not exceeding 1 in 308.				Maximum Gradient not exceeding 1 in 180.			
	Quantities.	Rate.	Amount.	Total.	Quantities.	Rate.	Amount.	Total.
Castleblaney to Armagh, 21½ miles 352 yards.			£ s. d.	£ s. d.			£ s. d.	£ s. d.
EARTH-WORK. Slopes 2 to 1; Base, 30 feet	Cubic Yards. 3,499,964	10d.	145,831 16 8		Cub. Yards. 3,027,776	9½d.	119,849 9 4	
MASONRY.								
Arches and Tunnels, for crossing principal roads	No. 5	£300	1,500 0 0		No. 5	£270	1,350 0 0	
Ditto ditto, for Parish and Bye roads	18	£200	3,600 0 0		18	£150	2,700 0 0	
Accommodation Bridges,	43	£100	4,300 0 0		43	£100	4,300 0 0	
Culverts	15	£140	2,100 0 0		15	£130	1,950 0 0	
Aqueduct for Stream at Lettereagh Houses	1		400 0 0		1		400 0 0	
Bridge over river Callan, near Armagh	1		3,500 0 0		1		3,060 0 0	
Ballasting and Boxing, including forming, levelling, and laying Ballast 18 inches, and Boxing 9 inches	Cubic Yards. 195,203	3s.	29,280 9 0		Cub. Yards. 195,203	3s.	29,280 9 0	
Blocks dressed and bored, &c.	No. 152,768	3s. 6d.	26,734 8 0	217,246 15 8	No. 152,768	3s. 6d.	26,734 8 0	189,624 6 4
IRON-WORK, &c.								
Rails, 152,768 lineal yds., at 42 lbs. per yard	Tons. Cwt. 2,864 8	£12	34,372 16 0		Tons. Cwt. 2,864 8	£12	34,372 16 0	
Chairs, at 14 lbs each; ½ double, at 21 lbs.	1,051	£8	8,408 0 0		1,051	£8	8,408 0 0	
Spikes and Keys, 3 to 1 lb.	1,364	30s.	2,046 0 0		1,364	30s.	2,046 0 0	
Oak Plugs	No. 305½	50s.	763 15 0	45,590 11 0	305½	50s.	763 15 0	45,590 11 0
Setting Blocks, fixing Chairs, and laying Rails	Lineal Yards. 38,192	2s. 6d		4,774 0 0	Lineal Yds. 38,192	2s. 6d.		4,774 0 0
Fencing and Draining	38,192	8s.		15,276 16 0	38,192	8s.		15,276 16 0
				282,888 0 8				255,265 13 4
Contingencies, at 10 per cent.	–	–	–	28,288 16 0				25,526 11 4
Land	Acres. 285	£50		24,250 0 0	Acres. 268	£50		13,400 0 0
				335,426 16 8				294,192 4 8

Appendix A. No. 4.

Report on the North and North-western Lines of Railway.

Estimates.

DUBLIN TO ARMAGH.—CARRYING ESTABLISHMENT, &c.

—		Gradients not exceeding 1 in 308.	Gradients not exceeding 1 in 180.
		£ s. d.	£ s. d.
Stations at Dublin and Navan		10,000 0 0	10,000 0 0
Castleblaney and Armagh, £2,500 each		5,000 0 0	5,000 0 0
Do. for Sidings, Crossings, &c., and intermediate Depots for Engines		5,000 0 0	5,000 0 0
Locomotive Engines, say 10 at £1,500 each		15,000 0 0	15,000 0 0
Carriages, 100 at £90	£9,000		
Do. 50 at £150	7,500	16,500 0 0	16,500 0 0
		51,500 0 0	51,500 0 0
Contingencies, 20 per cent.		10,300 0 0	10,300 0 0
		61,800 0 0	61,800 0 0

NOTE B.

ESTIMATE of a LINE of RAILWAY from NAVAN to ENNISKILLEN, through the Towns of KELLS, VIRGINIA, and CAVAN, referring to Maps, Sections, &c., prepared for the Railway Commission.

Navan to Kells.

NAVAN TO KELLS.

Description of Work.	Maximum Gradient, not exceeding 1 in 352.				Maximum Gradient not exceeding 1 in 180.			
	Quantities.	Rate.	Amount.	Total.	Quantities.	Rate.	Amount.	Total.
Navan to Kells, 9¾ miles.			£ s. d.	£ s. d.			£ s. d.	£ s. d.
EARTH-WORK. Slopes, 2 to 1, base, 30 feet	Cubic Yards. 405,165	10*d.*		16,881 17 6	Cubic Yds 377,310	9½*d.*	14,935 3 9	
MASONRY. Arches and Tunnels on principal Roads	No. 4	£300	1,200 0 0		No. 4	£270	1,080 0 0	
Ditto on Country Roads	5	£200	1,000 0 0		5	£150	750 0 0	
Accommodation Bridges	20	£100	2,000 0 0		20	£100	2,000 0 0	
Culverts	5	£140	700 0 0	4,900 0 0	5	£130	650 0 0	19,415 3 9
Ballasting and Boxing, including levelling and forming, ready for Blocks; Ballasting 18 inches, and Boxing 12	Cubic Yards. 87,706	3*s.*		13,155 18 0	Cube Yds. 87,706	3*s.*		13,155 18 0
Stone Blocks, dressed and bored	No. 68,640	3*s.* 6*d.*		12,012 0 0	No. 68,640	3*s.* 6*d.*		12,012 0 0
IRON-WORK. Rails, 68,640, at 42 lbs. per yard	Tons. 1287	£12	15,444 0 0		Tons. 1287	£12	15,444 0 0	
Chairs, 68,640, at 14 lb. add, for double, ⅕th, 13.728, at 7 lb.	Tons. Cwts. 471 18	£8	3,775 4 0		Tons. Cwts. 471 18	£8	3,775 4 0	
Spikes and Keys, 3 to 1 lb.	Cwt. 613	30*s.*	919 10 0		Cwt. 613	30*s.*	919 10 0	
Oak Plugs, 137,280, say,	No. 137½	50*s.*	343 15 0	20,482 9 0	No. 137½	50*s.*	343 15 0	20,482 9 0
Setting Blocks, fixing Chairs, and laying Rails	Lineal Yards. 17,160	2*s.* 6*d*		2,145 0 0	Lineal Yds. 17,160	2*s.* 6*d.*		2,145 0 0
Fencing and Draining	17,160	8*s.*		6,864 0 0	17,160	8*s.*		6,864 0 0
				76,441 4 6				74,074 10 9
Contingencies, at 10 per cent.	–	–	–	7,644 2 5				7,407 9 1
Land	Acres. 100	£60		6,000 0 0	Acres. 80	£60		4,800 0 0
				90,085 6 11				86,281 19 10

Report on the North and North-western Lines of Railway.

Estimates, Kells to Virginia.

KELLS TO VIRGINIA.

Description of Work.	Maximum Gradient not exceeding 1 in 352.				Maximum Gradient not exceeding 1 in 180.			
	Quantities.	Rate.	Amount.	Total.	Quantities.	Rate.	Amount.	Total.
Kells to Virginia, 12½ miles			£ s. d.	£ s. d.			£ s. d.	£ s. d.
EARTH-WORK. Slopes 2 to 1, base 30 feet	Cubic Yards. 1,088,120	10*d.*		45,338 6 8	Cubic Yds. 922,111	9½*d.*	36,500 4 6½	
MASONRY. Arches and Tunnels for crossing principal Roads	No. 2	£300	600 0 0		No. 2	£270	540 0 0	
Parish and bye Roads -	16	£200	3,200 0 0		16	£150	2,400 0 0	
Accommodation Bridges -	24	£100	2,400 0 0		24	£100	2,400 0 0	
Culverts - - - -	5	£140	700 0 0		5	£140	700 0 0	
Bridges over the Blackwater River - -	3		27,000 0 0		3		25,500 0 0	
				33,900 0 0				68,040 4 6½
Ballasting and Boxing, &c., including levelling, forming, and fixing, ready for Blocks; Ballasting 18 inches, and Boxing 12	Cubic Yards. 110,195	3*s.*		16,529 5 0	Cubic Yds. 110,195	3*s.*		16,529 5 0
Blocks, dressed and bored	No. 86,240	3*s.* 6*d.*		15,092 0 0	No. 86,240	3*s.* 6*d.*		15,092 0 0
IRON-WORK, &c. Rails, 86,240, at 42 lbs. per yard - -	Tons. 1,617	£12	19,404 0 0		Tons. Cwts. 1,617 0	£12	19,404 0 0	
Chairs, 14 lbs., with ⅛th double, at 21 lbs.	Tons. Cwt. 588 8	£8	4,707 4 0		588 8	£8	4,707 4 0	
Spikes and Keys, 3 to 1 lb.	Cwt. 770	30*s.*	1,155 0 0		Cwts. 770	30*s.*	1,155 0 0	
Oak Plugs, 173,000 -	173 cwt.	50*s.*	432 10 0		173	50*s.*	432 10 0	
				25,698 14 0				25,698 14 0
Setting Blocks, fixing Chairs, and laying Rails, ready for Sleepers	Lineal Yards. 21,560	2*s.* 6*d.*		2,695 0 0	Lineal Yds. 21,560	2*s.* 6*d.*		2,695 0 0
Fencing and Draining, -	21,560	8*s.*		8,624 0 0	21,560	8*s.*		8,624 0 0
				147,877 5 8				136,679 3 6½
Contingencies, at 10 per cent. - -	–	–	–	14,787 14 6				13,667 18 4¼
Land - -	Acres. 135	£50		6,750 0 0	Acres. 106	£50		5,300 0 0
				169,415 0 2				155,647 1 10¾

Virginia to Cavan.

VIRGINIA TO CAVAN.

Description of Work.	Maximum Gradient, not exceeding 1 in 352.				Maximum Gradient not exceeding 1 in 180.			
	Quantities.	Rate.	Amount.	Total.	Quantities.	Rate.	Amount.	Total.
Virginia to Cavan, 17½ mls.			£ s. d.	£ s. d.			£ s. d.	£ s. d.
EARTH-WORK. Slopes, 2 to 1, & base 30 feet	Cubic Yards. 3,850,416	10*d.*		160,434 0 0	Cubic Yds. 2,813,997	9½*d.*		111,387 7 7½
MASONRY. Arches and Tunnels for crossing principal Roads	No. 6	£300	1,800 0 0		No. 6	£270	1,620 0 0	
Parish and Bye roads -	27	£200	5,400 0 0		27	£150	4,050 0 0	
Culverts on small rivers, varying 12 feet span	6	£200	1,200 0 0		6	£200	1,200 0 0	
Culverts on small Rivers,	7	£200	1,400 0 0		7	£200	1,400 0 0	
Bridge on River flowing into Loch Ramor, near Virginia - -			14,000 0 0				12,000 0 0	
Accommodation Bridges -	35	£100	3,500 0 0		5	£100	3,500 0 0	
				27,300 0 0	3			23,770 0 0
Ballasting and Boxing, including levelling, forming, and laying, ready for Blocks; Ballasting 18 inches, and Boxing 12 - - -	Cubic Yards. 157,422	3*s.*		23,613 6 0	Cubic Yds. 157,422	3*s.*		23,613 6 0
Blocks, bored and dressed -	No. 125,200	3*s.* 6*d.*		21,560 0 0	No. 123,200	3*s.* 6*d.*		21,560 0 0
IRON-WORK, &c. Rails, 123,200, at 42 lb. per yard,	Tons. 2,310	£12	27,720 0 0		Tons. 2,310	£12	27,720 0 0	
Chairs at 14 lbs, with ½ double, at 21 lb.	847	£8	6,776 0 0		847	£8	6,776 0 0	
Spikes and Keys, 3 to 1 lb.	1100 cwt.	30*s.*	1,650 0 0		1100 cwt.	30*s.*	1,650 0 0	
Oak Plugs - - -	No. 246½	50*s.*	616 5 0		No. 246½	50*s.*	616 5 0	
				36,762 5 0				36,762 5 0
Carried forward -	-	-	-	269,669 11 0	-	-	-	217,092 18 7½

Appendix A.
No. 4.

Report on the North and North-western Lines of Railway.

Estimates.

Virginia to Cavan.

VIRGINIA TO CAVAN—(*continued.*)

Description of Work.	Maximum Gradient, not exceeding 1 in 352.				Maximum Gradient not exceeding 1 in 180.			
	Quantities.	Rate.	Amount.	Total.	Quantities.	Rate.	Amount.	Total.
			£ s. d.	£ s. d.			£ s. d.	£ s. d.
Brought forward, -	-	-		269,669 11 0	-	-	-	217,092 18 7½
IRON-WORK, &c. Setting Blocks, fixing Chairs, and laying Rails - - -	Lineal Yards. 30,800	2*s.* 6*d.*		3,850 0 0	Lineal Yds. 30,800	2*s.* 6*d.*		3,850 0 0
Fencing and Draining -	30,800	8*s.*		12,320 0 0	30,800	8*s.*		12,320 0 0
				285,839 11 0				233,262 18 7½
Contingencies at 10 per cent. - - -	–	–	–	28,583 19 1				23,326 14 2½
Land - - -	Acres. 230	£40		9,200 0 0	Acres. 221	£40		8,840 0 0
				323,623 10 1				265,429 13 10

Cavan to Enniskillen.

CAVAN TO ENNISKILLEN.

Description of Work.	Maximum Gradient not exceeding 1 in 352.				Maximum Gradient not exceeding 1 in 180.			
	Quantities.	Rate.	Amount.	Total.	Quantities.	Rate.	Amount.	Total.
Cavan to Enniskillen, 29 miles - -			£ s. d.	£ s. d.			£ s. d.	£ s. d.
EARTH-WORK. Slopes 2 to 1 - - -	Cubic Yards. 3,502,413	10*d.*		145,933 17 6	Cubic Yds. 3,664,989	9½*d.*		145,072 9 7½
MASONRY. Arches, Tunnels, &c., on principal Roads	No. 11	£300	3,300 0 0		No. 11	£270	2,970 0 0	
Arches, Tunnels, &c., on Occupation Roads	40	£200	8,000 0 0		40	£150	6,000 0 0	
Accommodation Bridges -	58	£100	5,800 0 0		58	£100	5,800 0 0	
Culverts on two Rivers, near 47th mile, 10 feet span - - -	2	£200	400 0 0		2	£200	400 0 0	
Culverts on River, near 53rd mile, 20 feet span, and at 57th mile 20 feet span - -	2	£400	800 0 0		2	£400	800 0 0	
Culverts on River, at 56th mile, 12 feet span	2	£250	500 0 0		2	£250	500 0 0	
Culverts on Streams -	9	£140	1,260 0 0		9	£140	1,260 0 0	
Bridge over River Erne -	1		11,000 0 0		1		10,000 0 0	
Bridge on Fim Water -	1		6,000 0 0		1		5,500 0 0	
Bridge on River, at 61st mile - - -	1		1,000 0 0		1		800 0 0	34,030 0 0
				38,060 0 0				
Ballasting and Boxing, including levelling, forming, and fixing, ready for Blocks, &c.; Ballasting 18 inches, Boxing 12 inches	Cubic Yards. 260,871	3*s.*		39,130 13 0	Cubic Yds. 260,871	3*s.*		39,130 13 0
Stone Blocks, bored and dressed - -	No. 204,160	3*s.* 6*d.*		35,728 0 0	204,160	3*s.* 6*d.*		35,728 0 0
IRON-WORK, &c. Rails, 51,040 yards laid with four lines of Rails, at 42 lbs. per yard	Tons. Cwts. 957 0	£12	11,484 0 0		Tons. Cwts. 957 0	£12	11,484 0 0	
Chairs, at 14 lbs. each, and ⅕th double, at 21 lbs. each - -	1,403 12	£8	11,228 16 0		1,403 12	£8	11,228 16 0	
Spikes and Keys - -	Cwts. 1,823	30*s.*	2,734 10 0		Cwts. 1,823	30*s.*	2,734 10 0	
Oak Plugs - - -	No. 408	50*s.*	1,020 0 0		No. 408	50*s.*	1,020 0 0	
				26,467 6 0				26,467 6 0
Setting Blocks, fixing Chairs, and laying Rails, &c. - -	No. 51,040	2*s.* 6*d.*		6,380 0 0	Lineal Yds. 51,040	2*s.* 6*d.*		6,380 0 0
Fencing and Draining -	Lineal Yards. 51,040	8*s.*		20,416 0 0	51,040	8*s.*		20,416 0 0
				312,115 16 6				307,224 8 7½
Contingencies, at 10 per cent. - - -	–	–	–	31,211 11 8				30,722 8 10
Land - - - -	Acres. 350	£60		21,000 0 0	Acres. 347	£60		20,820 0 0
				364,327 8 2				358,766 17 5½

NAVAN TO ENNISKILLEN.—CARRYING ESTABLISHMENT, &c.

Estimates.

—	Gradients not exceeding 1 in 352.			Gradients not exceeding 1 in 180.		
	£	s.	d.	£	s.	d.
Stations at Kells, Virginia, Cavan, and Enniskillen, at £2,500 each	10,000	0	0	10,000	0	0
Do. for Sidings, Crossings, and intermediate Depôts for Engines, and Watch Stations, £5,000	5,000	0	0	5,000	0	0
Locomotive Engines, 10 at 1,500	15,000	0	0	15,000	0	0
Carriages, 90 at £90	8,100	0	0	8,100	0	0
Do. 40 at £150	6,000	0	0	6,000	0	0
	44,100	0	0	44,100	0	0
Contingencies, at 20 per cent.	8,820	0	0	8,820	0	0
	52,920	0	0	52,920	0	0

NOTE C.

LENGTHS AND CLIVITIES.

Lengths and Clivities.

The length of the line, Dublin-(Navan)-Armagh, is divided for the convenience of exhibiting the lines lying between the principal towns, thus:—

A. Dublin-Navan.
B. Navan-Castleblaney.
C. Castleblaney-Armagh.

The distances, &c., under each of these divisions are tabulated, and so arranged that the peculiar character of the route, whether going from or returning to Dublin, may be distinctly ascertained.

The amount of the loss of power by useless acclivities, the length of level Railway equivalent to this loss, and the mean of it on traversing the lines in each direction are also stated.

Lineal Distance, in this table is the actual length of the Rail line, and is evidently the same in each of the two directions in which the line may be traversed.

Equivalent Distance, is such a length upon a level Railway as would require an expenditure of power equal to that which is required for the lineal admeasurement.

Mean equivalent Distance, is such a length on a level Railway as would require a power equal to that which would be required for half the sum of the lineal distances in both directions.

DUBLIN-NAVAN.

Dublin-Navan.

										Lineal Distance.		Mean Equiv. Distance.	
										Miles.	Yards.	Miles.	Yards.
A. DUBLIN-NAVAN { Lineal Distance										28	216	–	
A. DUBLIN-NAVAN { Mean Equivalent Distance										–		34	5
Direction.	Equivalent Distance.		Clivities.	Lineal Distance.		Clivities.	Equivalent Distance.		Direction.				
	Miles.	Yards.		Miles.	Yards.		Miles.	Yards.					
Dublin to Navan. ↓	–		1 in 364 Acc.	12	506	1 in 364 Decl.	–		↑ Navan to Dublin.				
	–		Level.	6	1628	Level.	–						
	8*	1,637	1 in 352 Decl.	7	1474	1 in 352 Accl.	2†	1,461					
	–		Level.	0	1188	Level.	–						
	28	216		27	1276		28	216					
	36	93					30	1,677					
									Mls. Yds.				
Dublin to Navan, Equivalent Distance									37 93				
Navan to Dublin, do.									30 1,677				
								2)	68 10				
DUBLIN-NAVAN, Mean Equivalent Distance									34 5				
Carried forward									–	28	216	34	5

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* This number is thus found:—Dublin is 106 feet above low water mark; Navan, 167 feet above low water mark; difference between Dublin and Navan, 61 feet. Between them there is a ridge of 284.6 feet above low water mark. Subtracting from the 167 feet (Navan height) gives an unproductive elevation of 117.6 feet; adding to this unproductive elevation the 61 feet (difference Dublin and Navan) gives useless acclivity 178.6 feet. This would be equal to 8 miles 1,637 yards of level Railway—the number inserted in the column.

† Subtracting 61 feet (difference Dublin and Navan) from the unproductive elevation, 117.6 feet, gives useless acclivity 56.6 feet, equal to level distance, 2 miles 1,461 yards.

Appendix A.
No. 4.

Report on the North and North-western Lines of Railway.

Lengths and Clivities.
Navan-Castleblaney.

LENGTHS AND CLIVITIES.—NAVAN-CASTLEBLANEY.

	Lineal Distance. Miles.	Lineal Distance. Yards.	Mean Equiv. Distance. Miles.	Mean Equiv. Distance. Yards.
Brought forward - -	28	216	34	5
B. NAVAN-CASTLEBLANEY { Lineal Distance - - - - -	36	340	–	
B. NAVAN-CASTLEBLANEY { Mean equivalent Distance - - -	-		40	956

Direction.	Equivalent Distance. Miles.	Equivalent Distance. Yards.	Clivities.	Lineal Distance. Miles.	Lineal Distance. Yards.	Clivities.	Equivalent Distance. Miles.	Equivalent Distance. Yards.	Direction.
Navan to Castleblaney. ↓	–	–	1 in 540 Accl.	8	330	1 in 540 Decl.	–		Castleblaney to Navan. ↑
		–	1 - 353 Decl.	5	1460	1 - 353 Accl.	–		
		–	Level.	6	1320	Level.	–		
	13*	704	1 in 851 Accl.	4	55	1 in 851 Decl.	4†	1232	
			1 - 308 Accl.	8	215	1 - 308 Decl.	–		
			1 - 702 Accl	3	480	1 - 702 Decl.	–		
	36	340		36	340		36	340	
	49	1044					31	868	

	Mls.	Yds.	Lineal Distance. Miles.	Lineal Distance. Yards.	Mean Equiv. Distance. Miles.	Mean Equiv. Distance. Yards.
Navan to Castleblaney, Equivalent Distance - - - - - -	49	1044				
Castleblaney to Navan do. do. - - - - - -	31	868				
2)	81	152				
Mean - -	40	956				
Carried forward - -	-		64	556	74	961

* Navan height, 167 feet; Castleblaney height, 348 feet, difference (Navan and Castleblaney) 181 feet; intervening ridge, 247 feet. Subtract from last 160 feet, the intervening depression, gives unproductive elevation 87 feet; adding unproductive elevation to 181 feet (difference Navan and Castleblaney) gives increase of power 268 feet = level Railway, 13 miles 704 yards.

† Subtracting 181 feet (difference Navan and Castleblaney), from unproductive elevation, 87 feet, gives increase of power 94 feet. Equal level Railway, 4 miles 1232 yards.

Castleblaney-Armagh.

CASTLEBLANEY-ARMAGH.

	Lineal Admeasurement. Miles.	Lineal Admeasurement. Yards.	Mean Equiv. Length. Miles.	Mean Equiv. Length. Yards.
Brought forward - -	64	556	74	961
C. CASTLEBLANEY-ARMAGH. { Lineal Distance - - - - -	21	1,060	–	
C. CASTLEBLANEY-ARMAGH. { Mean Equivalent Distance - - -	–		24	1,148

Direction.	Equivalent Distance. Miles.	Equivalent Distance. Yards.	Clivities.	Lineal Distance. Miles.	Lineal Distance. Yards	Clivities.	Equivalent Distance. Miles.	Equivalent Distance. Yards.	Direction.
Armagh to Castleblaney. ↓		–	1 in 2260 Accl.	1	500	1 in 2260 Decl.	–		Castleblaney to Armagh ↑
		–	1 - 359 Accl	3	1,660	1 - 359 Decl.	–		
	5*	1,496	1 - 359 Decl.	16	460	1 - 359 Accl.	11†	1,672	
		–	Level.	0	200	Level.	–		
	21	1,060		21	1,060		21	1,060	
	15	1,324					33	972	

	Mls.	Yds.	Lineal Admeasurement. Miles.	Lineal Admeasurement. Yards.	Mean Equiv. Length. Miles.	Mean Equiv. Length. Yards.
Castleblaney to Armagh, Equivalent Distance - - - - -	33	972				
Armagh to Castleblaney, do. do. - - - - -	15	1,324				
2)	49	536				
Mean - -	24	1,148				
TOTAL.						
DUBLIN-(NAVAN)-ARMAGH. { Lineal Distance - - - -	-		85	1,516		
DUBLIN-(NAVAN)-ARMAGH. { Mean Equivalent Distance - -	-		-		99	349

* Castleblaney height, 348 feet, Armagh height, 170 feet, difference between Castleblaney and Armagh, 178 feet; intervening ridge, 409 feet. Subtracting from ridge height, 348 feet (Castleblaney height) gives unproductive elevation, 61 feet; adding to unproductive elevation 178 feet (difference between Armagh and Castleblaney), gives increase of power, 117 feet = level distance, 5 miles 1,496 yards

† Adding 178 feet (difference between Armagh and Castleblaney) to unproductive elevation, 61 feet, gives increase of power, 239 feet. Equal to level Railway, 11 miles 1,672 yards.

Appendix A.
No. 4.

Report on the North and North-western Lines of Railway.

Lengths and Clivities, Dublin-(Navan)-Enniskillen.

LENGTHS AND CLIVITIES.—DUBLIN-(NAVAN)-ENNISKILLEN.

The Length of the Dublin-(Navan)-Enniskillen Line is divided as follows:—

Dublin to Navan.	F. Virginia-Cavan.
D. Navan-Kells.	G. Cavan-Enniskillen.
E. Kells-Virginia.	

	Lineal Distances.		Mean Equiv. Distance.	
	Miles.	Yards.	Miles.	Yards.
DUBLIN-NAVAN, Lineal Distance	28	216		
DUBLIN-NAVAN, Mean Equivalent Distance		-	34	85
D. NAVAN-KELLS, Lineal Admeasurement	9	1342		-
D. NAVAN-KELLS, Mean Equivalent Length		-	9	1342

Direction.	Equivalent Distance.		Clivities.	Lineal Distance.		Clivities.	Equivalent Distance.		Direction.
	Mls.	Yds.		Miles.	Yards.		Mls.	Yds.	
↓ Navan to Kells.	*2	1,531	Level. 1 in 736 Accl. Level. 1 in 382 Accl.	1 2 3 3	880 286 110 66	Level. 1 in 736 Decl. Level. 1 in 382 Decl.	2†	1,531	↑ Kells to Navan.
	9	1,342		9	1,342		9	1,342	
	12	1,113					6	1,571	

	Miles.	Yards.
Navan to Kells	12	1113
Kells to Navan	6	1571
2)	18	2684
	9	1342

---

* Navan-height, 167 feet; Kells, 224½ feet; difference (Navan and Kells,) 57½ feet; and as there is no intervening ridge here, this is 2 miles 1531 yards.

† Kells to Navan, a simple declivity, 2 miles 1531 yards.

Kells-Virginia.

KELLS-VIRGINIA.

	Lineal Distances.		Mean Equiv. Distance.	
	Miles.	Yards.	Miles	Yards
E. KELLS-VIRGINIA, Lineal Distance	11	1694		-
E. KELLS-VIRGINIA, Mean Equivalent Distance		-	11	1694

Direction.	Equivalent Distance.		Clivities.	Lineal Distance.		Clivities.	Equivalent Distance.		Direction.
	Miles.	Yards.		Miles.	Yards.		Miles.	Yards.	
↓ Kells to Virginia.*	 5	- 880 -	1 in 449 Accl. 1 - 412 Accl. 1 - 2532 Accl.	2 6 3	0 220 1474	1 in 449 Decl 1 - 412 Decl 12 - 532 Decl.	 5†	- 880 -	↑ Virginia to Kells.
	11	1694		11	1694		11	1694	
	17	814					6	814	

	Miles.	Yards.
Kells to Virginia, Equivalent Distance	17	814
Virginia to Kells do. do.	6	814
2)	23	1628
Mean	11	1694

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* Kells, 224.5; Virginia, 334.6; difference, (Kells and Virginia) 110; and, as there is no intervening ridge, &c. this is 5 miles 880 yards.

† Virginia to Kells, a simple declivity, 5 miles 880 yards.

Appendix A.
No. 4.

Report on the North and North-western Lines of Railway.

Lengths and Clivities.
Virginia-Cavan.

LENGTHS AND CLIVITIES.—VIRGINIA-CAVAN.

										Lineal Ad-measurement.		Mean Equiv. Distance.	
										Miles.	Yards.	Miles.	Yards.
F. VIRGINIA-CAVAN. { Lineal Distance - - - - - - -										18	690	–	
Mean Equivalent Distance - - - - -										–		25	1,042
Direction.	Equivalent Length.		Clivities.	Lineal Ad-measurement.		Clivities.	Equivalent Length.		Direction.				
	Miles.	Yards.		Miles.	Yards.		Miles.	Yards.					
↓ Virginia to Cavan.	8*	563	1 in 660 Accl.	5	880	1 in 660 Decl.	6†	141	↑ Cavan to Virginia.				
			1 - 639 Accl.	2	1,170	1 - 639 Decl.							
			1 - 4220 Accl.	1	400	1 - 4220 Decl.							
			1 - 350 Decl.	9	0	1 - 350 Accl.							
	18	690		18	690		18	690					
	26	1,253					24	831					
									Mls. Yds.				
Virginia to Cavan, Equivalent Distance - - - - - - -									26 1,253				
Cavan to Virginia, do. do. - - - - - - -									24 831				
2)									51 324				
Mean - -									25 1,042				
										68	422	81	563

* Virginia, 334.6 feet; Cavan, 227 feet; difference between Virginia and Cavan, 57.6 feet; intervening ridge, 398.6. Subtracting from ridge height, 334.6 feet, Virginia height, gives unproductive elevation 64 feet. Subtract from unproductive elevation, 57.6 feet (difference between Virginia and Cavan)—increase of power = level Railway, 8 miles 563 yards.

† 57.6 feet (difference between Virginia and Cavan) + 64 (unproductive elevation), gives 121.6—increase of power = level Railway, 6 miles 141 yards.

Cavan-Enniskillen.

CAVAN-ENNISKILLEN.

										Lineal Ad-measurement		Mean Equiv. Distance.	
										Miles.	Yards.	Miles.	Yards.
Total brought down - -										68	422	81	563
G. CAVAN-ENNISKILLEN. { Lineal Distance - - - - - -										28	60	–	
Mean Equivalent Distance - - - -										–		32	236
Direction.	Equivalent Length.		Clivities.	Lineal Ad-measurement.		Clivities.	Equivalent Length.		Direction				
	Miles.	Yards.		Miles.	Yards.		Miles.	Yards.					
↓ Cavan to Enniskillen.	2*	1,584	1 in 462 Decl.	8	180	1 in 462 Accl.	5†	528	↑ Enniskillen to Cavan.				
			Level.	2	880	Level.							
			1 in 1715 Accl.	1	1,670	1 in 1715 Decl.							
			Level.	7	0	Level.							
			1 in 868 Accl.	2	1,690	1 in 868 Decl.							
			Level.	5	920	Level.							
	28	60		28	60		28	60					
	30	1,644					33	588					
Cavan to Enniskillen, Lineal Admeasurement - -							30	1,644					
Enniskillen to Cavan, do. do. - -							33	588					
2)							64	472					
Total - - - -							32	236					
DUBLIN-(NAVAN)-ENNISKILLEN { Lineal Distance -										96	482		
Mean Equiv. Length												113	799

* Cavan, 277; Enniskillen, 195: difference between Cavan and Enniskillen, 82 feet. Intervening depression, 171 feet; subtract intervening depression from 195 (Enniskillen height), gives 24 feet unproductive elevation; subtracting unproductive elevation from 82 (difference between Cavan and Enniskillen), gives 98 feet = 2 miles 1,584 yards of level Railway.

† 82 feet (difference between Cavan and Enniskillen) + 24 (unproductive elevation) gives 106—increase of power = level Railway, 5 miles 528 yards.

APPENDIX A, No. 5.

REPORT ON PORTH-DYNLLAEN,

PRINTED BY ORDER OF THE HOUSE OF COMMONS, 14TH JUNE, 1838.

Appendix A.
No. 5.

Report on Porth-Dynllaen Harbour.

PORTH-DYNLLAEN, in the south part of Caernarvon Bay, is formed by a narrow rocky projection of the coast from 60 to 100 feet high, the north extreme point of which bears, by Compass,

From	Bardsey Island	N.E. by E.	distance	14	Geo. Miles.
—	Holyhead (South Stack Light-house)	S. by W. ½ W.	„	22¾	„
—	Caernarvon Bar (entrance to Menai Strait)	S.W. by W. ½ W.	„	12½	„
—	Liverpool *via* Holyhead	-	„	87	„
—	Liverpool *via* Menai Strait	-	„	67	„
—	Small's Light-house	N.E. by E.	„	80	„
—	Kingstown Harbour, Dublin	-	„	65	„
—	Wicklow	-	„	58	„

In an easterly direction, from the above extreme point, Porth-Dynllaen Bay is about 2,240 yards wide, and its greatest extent at right angles to that line of direction is rather more than 1,000 yards.

The bay is generally clean, with the exception of a large rock, called Carrig-y-Chwislen, which is bold to, and uncovers the last quarter ebb. The dimensions of this rock are, from east to west, its longest extent, 100 feet; and its breadth, from north to south, about 50 feet. It lies east by compass from the extreme point above mentioned, leaving a clear sound, with five fathoms depth between it and the point, and distant therefrom 1,280 feet.

The depth of water in Porth-Dynllaen Bay at low water springs, is 4½ fathoms sand over clay, that depth decreasing gradually to the sandy beach which bounds it.

The extent of the bay, at least that portion of it which may be made available for shipping, contains an area of about 110 or 115 acres, throughout the whole of which space the least water would be two fathoms at low water springs.

The general set of the tide in the Bay of Porth-Dynllaen is from the eastward along its eastern shore, and through the sound above mentioned, continuing at least nine hours of the twelve. In the sound at spring tides the stream has a velocity of about three knots, but in the bay itself little or no tide is felt, vessels riding flood with their heads to the northward only during the first two hours of the tide.

It is high water at Porth-Dynllaen at 8 h. 30 m. on full and change days, and the rise at springs is 16 feet.

On the west side of the bay convenient quays and a pier might be built, where large steam-vessels, drawing 15 feet water, might always lie afloat, to the number of eight or more, provided these quays were protected by a breakwater connected with the abovementioned rock, "Carrig-y-Chwislen," and so placed with relation to the pier, that a clear channel should be left through the sound for the passage of vessels into and out of the harbour without exposing them to any body of sea. With such protection I have no doubt that vessels lying alongside of the quay would invariably be in smooth water.

As there would be no backwater or scouring action of the tide, except through the sound to seaward, which would be favourable, there is reason to conclude that the quays would be constantly kept clear from silt or deposit; a consideration of great weight in the formation of a harbour.

This harbour would be peculiarly easy of access or departure, as the Rivel Mountain would ensure a good land-fall, as from the nature of its approach and its excellent shelter, steam-vessels would leave and arrive at their moorings in smooth water, and as in stormy weather they might make a slant out instead of being obliged to stem a heavy breaking sea.

In the event of any accident happening to the engines the harbour might be regained with facility under canvass.

Having thus described Porth-Dynllaen, and pointed out its peculiar advantages of approach and departure, its excellent shelter, its clean anchorage, and the facility it affords for the construction of quays and piers, I may venture to give my opinion that it is well calculated for a packet station, and that there is no other port on the west coast of Wales which could be so well or so economically adapted to that purpose.

The foregoing advantages must also have great weight, when considering it in the light of a harbour of refuge. The whole coast of Wales included between Milford and Liverpool presents no place of safety for which a vessel in distress can run in bad weather; St. Tudwall's Roads being by no means, under many circumstances, a safe roadstead, and all the ports being bar harbours, to be taken only in the day time near the top of high water, and then with some difficulty; if, therefore, it be desirable that the trade of St. George's Channel should have a harbour of refuge on this coast, then there is none so well adapted to that purpose as the bay of Porth-Dynllaen might be made. It is situated nearly midway between the Small's Lighthouse and Liverpool; it has an excellent light (Bardsey) within 14 miles of it on one side, and a second light (the Stack) within 23 miles of it on the other; it has an approach perfectly free from shoals of any kind; and the adjacent mountains being the most remarkable in North Wales, would serve as infallible marks to point it out.

As vessels navigating this channel usually draw under 15 or 16 feet, ample room might be found in Porth-Dynllaen by a judicious harbour-master for 10 large vessels, while smaller ones, such as the ordinary class of coasters, might either be anchored further in shore, a portion of the bay being set apart for that purpose, or they might take the ground in perfect safety.

As a refuge harbour, however, it would only serve on a small scale; yet though not calculated for the reception or rendezvous of a very large number of vessels, there is no other place on this coast possessing similar advantages. It has also been urged against Porth-Dynllaen as a refuge harbour, that it is too deeply seated in Caernarvon Bay; but such a condition appears to me in its favour, as it is more likely to meet the necessities of distressed ships; and it is not so deeply embayed as to prevent them from resuming their voyage with facility when required.

Porth-Dynllaen, even in its present state, affords shelter to the coasters in most weathers; it is open only to winds from north to east; those winds do not bring with them a heavy sea, having a drift only of 23 miles, and several shallow banks break its force from that quarter.

The heaviest sea brought into Porth-Dynllaen is by winds from W. N. W. to N. N. W., against the effects of which it is absolutely necessary to guard; this, however, would be effectually done by means of the pier and breakwater above alluded to, if properly constructed and judiciously placed by a good engineer.

(Signed) W. L. SHERINGHAM, *Lieut., R.N., and Surveyor.*

APPENDIX A.

No. 6.

REPORTS

ON THE

WESTERN HARBOURS OF IRELAND,

BY CAPTAIN EVANS, R.N.

IN 1835.

BLACK SOD BAY.

Appendix A.
No. 6.

Reports on the Western Harbours of Ireland.

Black Sod Bay.

Black Sod Bay contains three anchorages, namely, Black Sod, Ely, and Claggan, each of which would require an extensive breakwater with a landing slip to be erected.

Black Sod and Ely, being on the western side of the bay renders them unfit for packet stations, and even inconvenient for commercial purposes, as all articles intended to be sent by land to the interior of Ireland from either of these ports, must be forwarded by the circuitous route of Belmullet, which is situated at the head of the bay, at a considerable distance.

Claggan being on the eastern side, or the main land, might be made a very good and safe harbour, by running out a breakwater over the bank which extends from Claggan head to the westward.

Were a harbour thus formed at Claggan, a communication by canal with Broad Haven might be effected; thus uniting Broad Haven, Black Sod, and Clew Bay, and forming the finest possible inland channel for steam vessels between those places; and tending to open the trade of the north-west of Ireland with Scotland.

Were Black Sod Bay to be made a good place for shipping, it would be necessary to erect two light-houses; one on the Black Rocks, the other on Claggan Head.

From the heavy swell that sets into Black Sod Bay in gales of wind, it will never be a desirable place for vessels until breakwaters are built either off Ely point, or Claggan point. The bottom all over the bay is sandy, and therefore not the best kind of holding ground.

In Ely and Claggan, the bottom is muddy and good, and of sufficient depth in both places, were breakwaters constructed.

The worst feature in Black Sod Bay is, that should a vessel after entering be not able to get up to the anchorage in north-west, or northerly winds, there is no safe place for her to lie at the bottom of the bay.

In this bay there are several rocks that ought to have perches, or buoys over them for the safety both of vessels and boats.

The first of these rocks is met with on entering Black Sod Bay; it lies to the northward of Black Sod pier, and is called Corrigmore. A vessel some time since, in hauling round the point grounded on it, and was with great difficulty saved by the exertions of the Coast Guard.

I do not think Black Sod at all eligible for a packet station.

NEWPORT, OR WESTPORT BAY.

Newport or Westport Bay.

Newport, or Westport Bay is full of overfalls, with very irregular soundings; and although I did not find less than five fathom outside the islands, yet it requires to be very carefully surveyed before generally made use of.

Innislyre harbour is formed by an island of that name, and is capable of admitting vessels drawing fourteen feet of water at all times of tide. It is a very safe and good harbour. The entrance which is narrow but deep, lies between the light-house on Ennis Gort and the bar. In it I found eight fathoms until I passed the light-house.

About a mile west of the light-house several patches, of from four to five fathoms with very irregular soundings, will be found; but on approaching the light-house entrance the water deepens to nine and ten fathoms.

The channel into Innis Gould would require to be well surveyed; but when once in, very good and safe anchorage will be found.

No vessel, except in case of necessity, should attempt these harbours without a pilot, but particularly that of Innis Gould, as the Laarbaan Rocks, which lie about a mile out in the bay, do not show, except by the sea breaking on them at low water, and are directly in the way of a vessel running for Innis Gould.

To make Innis Gould safe, there should be a light-house on the Laarbaan Rocks.

To render the harbours inside the islands of Newport Bay available for shipping, it will be necessary to survey the Bay well; and owing to the irregularity of the soundings, great pains must be taken to ascertain the proper depth of water.

Additional light-houses must be erected to point out the entrance to Innis Gould. Pilots must be always ready at Clare island to board vessels as soon as they get to the eastward of the island. Wharfs must be erected in the harbours among the islands, and these must be connected with the main land.

These necessary works would require a considerable outlay, but they might be easily and readily performed, and render the harbours inside the islands of Newport Bay a desirable place for shipping.

Newport Bay is. in my opinion, equally objectionable as a packet station, as that of Galway.

Appendix A.
No. 6.

Reports on the Western Harbours of Ireland.

Galway Bay.

GALWAY BAY.

Galway is a tide harbour, the quays on both sides of the river being dry at low water. The rise and fall in ordinary spring tides is fourteen feet.

Galway Roads is the only place where a vessel can lie afloat at low water. It lies to the south-east of Mutton island, and has from three to six fathoms good holding ground.

At present this roadstead is exposed to the south-west gales, and requires a breakwater to be run out from the south end of Mutton island to protect it. The breakwater would not extend more than two cables length to the southward of Mutton island, to embrace a good anchorage with four fathoms at low water spring tides.

Mutton Island being steep too, an excellent quay might be constructed at a moderate expense, along its southern beach, connecting the minor part of the breakwater with Slate quay, now forming the larboard entrance into the river.

Along the quay, ships would always lie afloat, and be well protected, having their heads to the south-west, the best possible direction.

A ridge of rocks extends from Mutton island to the main land, over which an excellent causeway might be constructed. The expense of the work would be amply repaid by the value of the land for building store-houses.

A tram road along the causeway would facilitate the removal of cargoes; and for all commercial purposes, be equal to having the ships at the town.

A very good dock is now constructing at Galway, which at high water will admit vessels drawing fourteen feet. It is intended to communicate with a lake above the town, and thus open the resources of the country.

This dock will be very useful for steam vessels until the breakwater is made, as they can lie afloat in it.

Westerly gales alone could prevent a vessel beating out of Galway bay; and sheltered as the bay is by the Arran isles, if a ship could not beat out of it, she would make but little progress outside.

A vessel beating out of Galway bay has the same advantage as if she were beating out of the English channel; that is, by keeping in the parallel of latitude of the bay, she would have several harbours under her lee in case of necessity.

Galway, in my opinion, is too far north for a packet station, independent of its being situated at the bottom of a bay, which must naturally retard both the arrival and departure of the packets; but if a breakwater were constructed, it possesses advantages that might make it a commercial town of importance.

VALENTIA HARBOUR.

Valentia Harbour.

I found Mr. Nimmo's chart of Valentia very correct. The river Carhin, as far as Carrickciveen, is navigable at high water for vessels drawing from ten to twelve feet. There is good anchorage for that class of vessels off Tohill island.

The Lough Kay channel is the best for vessels going up the river, as they will avoid the bar between the Ferry-house and Church island. It may also be very useful to any vessel that might miss the north-west entrance.

The north-west entrance into the harbour of Valentia, between Cromwell's fort and Beg Innis, is very narrow, being only a cable's length; but it is safe, and when once inside, good anchorage sheltered from every wind will be found up to the Foot point, with from six to seven fathoms water.

Care must be taken in rounding Cromwell's Fort point, as the rocks lie out some distance to the northward.

The harbour's mouth ought to be well open before running in, which makes it more difficult for sailing vessels.

About a quarter of mile inside the north-west entrance, lies the harbour rock in mid-channel; it dries at the last quarter of ebb. This rock would require a light-house on it, and would serve to point out the entrance, day or night, in coming from sea.

From the confinement of the north-west entrance to Valentia harbour, I do not think it could ever be available for sailing packets; although, were very powerful steamers, such as must necessarily be employed to cross the Atlantic, occasionally to assist in towing the packets in and out, much might be effected.

The western channel from Valentia to the Atlantic, is very narrow for about a mile; it has only seven feet water in some places at low water spring tides, and the entrance, which is only two cable's length wide, is exposed to a heavy sea when it blows from W.N.W. round to S.S.W.

This entrance to Valentia would only be available for steam packets, and their station must be below Fort Magee, just inside the entrance, where there is good anchorage for a few vessels in four fathoms water. When the westerly gales set in, the steam packets might run round at high water, and go to sea by the north-west entrance.

A sailing packet on leaving the north-west entrance during a westerly gale, would have to beat dead to windward against a heavy sea, to clear Valentia island to the southward, or the Blaskets to the northward; and should any accident happen, there is no harbour under her lee.

No sailing packet could have either entrance of Valentia with the wind blowing hard from N.N.W to W.N.W.

Steamers alone could, in such cases, be available as packets. They could always go out whenever they could make any progress, either to America, or the West Indies by being outside.

The same remarks would also apply to the sailing packets, for when they could not beat up so as to weather the Blaskets, or Valentia, they could not make any progress on a western voyage, and might as well be in the harbour; but many cases might occur when a steamer could get out and proceed without being able to tow a sailing packet out of either entrances of Valentia harbour, as the steamer would find it hard work to get out alone.

Taking every thing into consideration, it is my opinion, that Valentia might, by erecting proper light-houses, be made available as a steam packet station, but not as a sailing packet station, when the packet must go out in all weather.

These remarks do not, of course, apply to merchant vessels, as they can always suit their sailing to the weather.

Valentia harbour offers, independent of its excellent anchorage, one of the best places for a pier, or landing place imaginable. It is at the Foot point, where a spit of sand runs out which dries at low water, and has at its extremity, only a few yards distant from where it dries, six fathoms; the end of the spit being nearly perpendicular.

Appendix A.
No. 6.

Reports on the Western Harbours of Ireland.

Bantry Harbour, or Berehaven.

BANTRY HARBOUR, OR BEREHAVEN.

Bantry Harbour, and from Bluehill down between Whiddy, Chappel, Rabbit, and Horn Islands, consists of muddy bottom, good holding ground, and from 4 to 6 fathoms regular soundings, well sheltered from every wind and sea. The bay, from Bantry Harbour to Berehaven, is clear of danger, and may, with the assistance of the chart, be used by strangers.

Castletown Harbour, in Berehaven, is a very good one for small vessels, drawing about 10 feet water. Such vessels may enter it at all times of tide; the rise and fall being, in ordinary spring tides, about 12 feet. This harbour would contain a number of small vessels secure from all winds.

The western entrance to Berehaven is confined, being about 200 fathoms across the narrowest part, but it widens immediately, both inside and outside.

The tide does not set very strong through this entrance, seldom exceeding two knots, except after heavy rains.

In coming in the western entrance, the starboard, or Bere Island shore must be kept on board, as there are several rocks, called the Colts, on the larboard side, near the main land. These rocks might easily be buoyed off, and are not in the channel.

I see no difficulty in any vessel taking this entrance with a leading wind.

I found deep water all over Berehaven, varying from 15 to 6 fathoms; fine holding ground, and well sheltered both from wind and sea.

The eastern entrance to Berehaven is a very good one; and if a ship could not get to sea from the western entrance, she could always get out of the eastern, as long as she could carry canvass.

The Dog Rocks, which are covered only at high water, and generally show by the sea breaking on them, lie about two cables' length off the east end of Bere Island, and must be left on the larboard hand going in. The passage between those rocks and the island is very narrow, and not to be attempted by strangers. The eastern entrance to Berehaven lies between the Dog Rocks and the Sea Islands, or, as the natives call them, the Roan Corrigs.

The entrance is very deep, having 19 fathoms all the way across it, and is of sufficient breadth for any vessel to beat in against a head wind. The passage between the Seal Islands is also good and deep, as well as the passage between the North Seal Island and the main land.

E.N.E., true bearing, and about three-fourths of a mile from the South, or Great Seal Islands lie, the Ducallagh Rock, which only appears at low water spring tides. This rock should have a buoy placed on it to guide vesssels going up to Bantry; and the Dog Rocks should either be buoyed off, or a small light-house built on the outer or large one, which would render the eastern entrance available, day or night, with perfect safety.

By these few necessary works, of trifling expense, Berehaven would be made as fine and safe a harbour as could be desired.

Should a vessel, in attempting to beat out of Bantry Bay during a westerly gale, carry away any of her spars, or get disabled, so as not to fetch back into Berehaven, she might then bear up, and run either for Glengariff, or Whiddy Island, where there is good and safe anchorage for any class of vessel. Bere Island is remarkably well calculated for either a naval or military depôt; and Lawrence's Cove is formed by nature for a naval arsenal; docks to any extent might be constructed there at a very moderate expense, and vessels may be hove down close alongside the shore, in perfectly smooth water in all weather; the rocky beach forming a natural quay.

Bere Island is a healthy situation, producing plenty of vegetables, abounding in fresh water springs, and fish is plentiful and cheap.

Were Berehaven made a naval and military depot, the communication between it and the town of Bantry would be carried on by steam vessels. This would obviate the circuitous route by land (28 Irish miles) between these places, and connect Berehaven with a place to which, perhaps, a Railroad might be constructed, either from Cork or Dublin.

Depôts of troops, stationed at Berehaven, would be in the best possible situation in the United Kingdom, for embarkation to the Colonies; whilst a great facility for removing them to or from any part of Ireland that might require their presence, would be afforded by making Bantry the termination of the contemplated Railroad from Dublin.

I need scarcely add, that provisions could be obtained at a more moderate rate than in England, and that there would be little difficulty in obtaining plenty of men both for the army and Navy.

Could a Railroad be made from Dublin to Bantry, Berehaven would possess every advantage necessary for a packet station, namely, facility of egress and ingress, in all weather that a ship could keep the sea: a good harbour under the lee, if beating out; plenty of sea room when once well outside the bay, and, owing to the prevailing winds being from the south-west and west, a vessel leaving Berehaven would command the coasts of Spain, Portugal, and the Mediterranean, as well as be in the most desirable spot of departure for either the West Indies or America.

A convincing proof of this occurred whilst I was at Berehaven. Several vessels having put in there during a very heavy gale from the southward, the moment the gale abated they went to sea. On my way to Berehaven, I left transports, with troops on board, wind-bound, at Cork; and, on my return from Berehaven, those vessels were still lying at Cork, not having been able to get out. Had these troops been at Berehaven, they would have been far advanced on their voyage to the West Indies, before they were able to leave Cork.

The same advantages would apply to a fleet or squadron, lying in Berehaven during a war.

Were Berehaven made a naval arsenal and military depôt, or even were it made a packet station, it would be productive of very great advantage to the commerce of Great Britain, as merchant vessels would then be glad to resort to it, and many valuable ships and lives would be saved.

The present exorbitant demands for salvage, made by the boatmen for the slightest assistance rendered to a ship, prevent vessels in distress going there.

I may, in conclusion, observe, that Berehaven is well situated for steam communication with the south of Ireland and England: it is a harbour that, in a political point of view, should not be left unprotected, being the only one on the Irish coast where an enemy's fleet could well attempt to run for. Were it connected by a Railroad to Dublin, and the London and Liverpool Railroad finished, advantages would accrue to Ireland that few can possibly foresee the consequences of, from the rapidly increasing trade with America, the great natural advantages which Bandon and its vicinity afford for erecting manufactories, by employing water, as at Greenock, to work the machinery.

APPENDIX A.

No. 7.

OBSERVATIONS BY MESSRS. HENRY, MULLINS, AND MAC MAHON, ON THE GRAND AND ROYAL CANALS.

Dated February, 1823.

Appendix A.
No. 7.

Observations on the Grand and Royal Canals.

The Grand Canal, including the Liffey line and the branches to Athy, Miltown, Blackwood, Ballyteague, and Edenderry, may be taken at 100 miles in length: the rise, from its communication with the Liffey near Ringsend to the summit, is 278 feet; and the fall, from thence to the Barrow at Athy, is 97 feet; and to the Shannon at Banagher, 162 feet: making a total rise and fall upon the whole extent of this Navigation of 537 feet; which divided by the length, 100 miles, will give 5⅓ feet per mile for its lockage; and the money actually expended upon the work—according to an account extracted from the Papers relating to the Inland Navigations of Ireland, printed by order of the House of Commons 22nd July, 1812—amounts to £844,216 14*s.* 8*d.*; not including a sum of £122,148 19*s.* 1½*d.* which it is stated the Docks have cost. These data give £8,442, as the rate per mile which the Grand Canal has cost in actual expenditure upon that work; according to the statement herein before referred to. But if the entire expenditure of that concern be taken into account, it will stand thus,—

CAPITAL.

Stock Debentures issued by the Company, - - - - - - - - -		£600,000
Amount of several Parliamentary Grants; exclusive of the sum received from the Directors General for the improvement of the Middle Shannon, - - - - - - -		93,258
Amount of Grant to be applied to the reduction of their Debt, - - - - -		150,000
Amount of Debt created, - - - - - - - - -	£1,167,750	
Less, amount of Grant for reduction of Debt, - - - - -	150,000	
		1,017,750
Total, - - - -		£1,861,008

Equal to the sum of £18,610 per mile on 100 miles of still water navigation: which—although yielding, even in the present depressed state of the country, a net profit of at least £300 per mile, per annum—would amount only to about 1⅝ per cent. per annum on the immense capital expended.

It has been already shown, that if this canal had been constructed upon a scale better adapted to the sources from whence the Company were to derive their income, it could have been executed for full one-third less than the scale of canal which they adopted should have cost; and if the rate of lockage upon it be contrasted with that upon the Derry Canal, the cost of execution should be, at least, £1000 per mile less upon the former, than upon the latter; and, as it must be confessed that no line of canal, hitherto executed in Ireland, passes through a more intricate country than that through which it is proposed to carry the Derry Canal, or one that requires more the skill and consideration of practical engineers, the comparison would be obviously in favor of the Grand Canal. If, therefore, the cost of this canal were to be rated at £3,800 per mile on the scale referred to, (and there appears to us ample reason to conclude that this rate would, under judicious management, be quite sufficient,) instead of that concern being, as it now is, of no benefit to the Stockholders—its net Revenue discharging only about two-thirds of the interest accruing yearly upon their debt—it would yield a rate of profit of 7½ per cent. per annum, upon a capital stock of £402,800; which the canal would, under the circumstances stated, have cost, notwithstanding the proximity of that ill-advised line of navigation—the Royal Canal. But even on the scale adopted, had the Company not fallen upon the fatal blunders that have been made—professional and otherwise—in the prosecution of that great national work, they would find themselves in far different circumstances to those in which they are placed; the discouragement which their difficulties have thrown upon canal speculations would not have occurred; and the country and the Government might now have been reaping the benefit of an extended system of Inland Navigation—alike increasing the Capital and the Revenues of the Empire.

The Royal Canal, extending from the river Liffey at Dublin, to the river Shannon at Tarmonbarry, a distance of 72 Irish miles, has its summit at an elevation of 322 feet above the former, and 191 feet above the latter: its rate of lockage therefore is 7⅛ feet per mile, and the sum *bona fide* applied to the execution of the works—according to the Papers laid before Parliament,*—exclusive of the cost of the late extension from Coolnahay to the Shannon, a distance of 25 miles which had been executed wholly at the Public expense, amounts to £776,213 1*s.* 11*d.*; or £10,780 per mile.

	£	*s.*	*d.*
The original stock of the late Royal Canal Company amounted nominally to £300,000, for which they issued Stock Debentures; net proceeds of which received in cash, - - - - - - - - - -	172,964	10	0
Parliamentary Grants, at different periods from 1791 to 1798, - - -	91,123	15	3
Grant from the funds at the disposal of the Directors General in 1801, under an agreement with them, - - - - - - - - - -	95,866	7	10
Cost of executing the canal from Coolnahay to Tarmonbarry, wholly at the Public expense. - - - - - - - - - - - -	200,000	0	0
Amount of Debt created by the late Company, and which forms the Stock of the new Royal Canal Company, as directed by Parliament; upon which no Interest on dividend has been paid from 3rd December, 1810, to the present time, save one Dividend of 6*s.* 8*d.* per cent. - - - - - -	862,000	0	0
Total Cost of Canal, - - - -	£1,421,954	13	1

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* Irish Commons' Journals, Vol. 19, part 2, page 1019. Appendix No. 10, 13th Report of Commissioners of Inquiry.

Appendix A.
No. 7.

Observations on the Grand and Royal Canals.

Or £19,749 7*s.* 5*d.* per mile; which this Canal has cost the original and present Proprietors and the Public!!!—exclusive of interest upon Stock, Loan, and Grants from the Government, for many years. The rate of profit may now be reckoned at about £120 per mile per annum, or ⅗ths per cent. upon the Capital expended!!!

The observations that have been made upon the Grand Canal, bear much more forcibly upon this: It commenced in error, and so continued until the dissolution of the Company. At 35 miles' distance from Dublin—after having overcome three hundred and twenty-two feet of lockage,* and other works of great difficulty; such as the excavation through the quarries of Carpenterstown, the embankment and aqueduct across the Rye water, the cutting through the bog of Cappagh, &c., it is but eight miles, at right angles to it, distant from the Grand Canal; and at many places not more than 4 miles; so that these two great canals, for more than half the length of each westward of the metropolis, are performing little more than the work of one, and hence the unproductiveness of both. Had the western branch of the Grand Canal entered the Shannon at Athlone, it would have commanded the trade of the Middle, Upper, and Lower Shannon: two-thirds of the gross income of the Royal Canal† would, in that case, have fallen into the receipts of the Grand Canal Company; as the cost of management and maintenance of one of the parallel lines would have been avoided; a choice of departure—at any required point of elevation—for a line of divergence northward, would be had; and the monies expended by the Royal Canal Company in attaining to such height, without any comparatively beneficial object; and the sums subsequently expended on the completion of this very unproductive work, would, under skilful management, have been sufficient to open lines of communication, by Inland Navigation, between the main trunk of the Grand Canal, and the ports of Ballyshannon, Derry, Coleraine, Belfast, Newry, Dundalk, and Drogheda;—connecting these ports and the principal towns in the interior, on one side; whilst the country south of the supposed trunk would lie open to the enterprize of the Grand Canal Company; whose means would—had such an arrangement been made—enable them to extend the benefits of water conveyance to districts far south of their present Establishments. It is but justice to add, that this Company entertained the project of entering the Shannon at Athlone, instead of Banagher; that they prosecuted their works at all times with much spirit, at a great sacrifice of their own property and at considerably less expense to the Public than any other Canal Company in Ireland—the Lagan Company excepted: and when it is recollected that, in the infancy of their undertaking, a professional man of some eminence had recommended the adoption of Batterdeaux, as necessary to the perfection of canals through deep bogs; that a Smeaton had made use of those emphatic words,‡ "avoid a bog if you can, but by all means possible the going "deep into it; nor will any consideration prevail on me to pronounce that practicable, that I can foresee "no adequate means of effecting;" and that a Jessop, his pupil, (both eminent men in their day) built three parallel locks of communication between the floating docks at Ringsend and the Liffey—where one would have answered every purpose for which they were intended; difference of loss of water, or of time not being estimable considerations—it is not to be wondered at, that a profuse expenditure had been not only unnecessarily, but uselessly incurred.

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* Every 10 feet of Lockage costs about £2,300, under common circumstances.

† Yielding now about £20,000, per Annum

‡ See Smeaton's Reports, vol. 2, page 267.

SUMMARY of the COMPARATIVE RATES of EXPENSE PER MILE, of several NAVIGATIONS in IRELAND; exhibiting the RATE of LOCKAGE upon each respectively.

DENOMINATIONS.	Length.	Rate of Lockage	Cost of Execution per Mile.			Total Cost.			Observations.
	Miles.	Feet.	£	*s.*	*d.*	£	*s.*	*d.*	
Grand Canal, - -	100	5⅓	18,610	0	0	1,861,008	0	0	The capital expended is exclusive of the revenues arising from the undertaking, but includes portions of dividends made thereout.
Royal Canal, - -	72	7⅛	19,749	7	5	1,421,954	13	1	Same as foregoing.
Limerick Navigation,	12	7	10,296	13	0	123,559	16	1	6½ miles still water; 5½ river navigation.
Barrow Navigation,	34	5	7,220	0	0	255,501	16	0	5 miles still water; 29 river navigation.
Boyne Navigation, -	15½	5⅓	7,463	0	0	115,677	11	5½	Partly still water, partly river navigation.
Newry and Tyrone Navigations, - -	27	3⅝	2,804	0	0	75,730	10	1½	Cost of improvement and repairs *only*.
Lagan Navigation, -	22	8½	4,363	0	0	96,000	0	0	Exclusive of local duties.

APPENDIX A.

No. 8.

LETTER FROM WM. WILLANS, Esq., ON THE WOOLLEN MANUFACTURE OF IRELAND.

Appendix A.
No. 8.

Letter from
W. Willans, Esq.

To Major H. D. Jones, R.E., Secretary to the Railway Commission.

Sir,—I received your communication of the 9th instant, directed to me at Mr. Drummond's request, requiring my opinion on the state of the woollen trade, and I have to regret my inability (owing to various engagements) to reply to it sooner.

In my interview with the gentlemen of the Railroad Commission, I stated that a considerable diminution had taken place in this manufacture since the year 1822, the period when the Commission sat to inquire into the state of the revenue in Ireland. In the Appendix to the Fourth Report (of November) in that year, there is a paper given in by Mr. Haughton, who, with several others, was examined as to the effect the repeal of the duties imposed on English woollens imported into Ireland would have on the manufacturers in this country; which paper states that there existed in and about Dublin 45 manufacturers, having 92 billies, giving employment to 2,885 work people, on whom depended for support 7386 individuals, manufacturing 29,312 pieces of cloth, of various qualities, valued at £336,380, and that the capital invested in buildings and machinery was £195,900.

I think the quantity and value of the articles manufactured at the period referred to were estimated too high; and it appears to me that the estimate had respect to what the number of billies then engaged could produce if fully employed, rather than the amount which they actually did produce. I am, therefore, inclined to suppose that one-fourth less would be a nearer approximation to the fact; and in comparing the quantity and value of goods manufactured at the same period, owing to the then high prices, with the quantity and value of the goods now made, a reduction of 20 per cent. on the value, as reduced one-fourth, would give the amount of the article then manufactured, in present value, to be £201,828.

There are now about 36 billies employed within the same district, and the value of the articles now manufactured may be about £90,000, certainly not £100,000. The manufacture has, therefore, fallen off more than one-half.

In the same paper there are returned from the districts of Cork, Kilkenny, Moate, and Carrick-on-Suir, 3184 persons engaged, 9876 depending on them, 19,322 pieces manufactured, value £199,100, and capital invested in buildings and machinery, £116,700. This return I think a good deal overrated, both as to the number of persons employed, and as to the quantity and value of the article produced. At the present time, I am informed that all those districts together do not manufacture to the extent of £20,000.

In the same paper, the flannel trade of Wicklow and Wexford is estimated at 3000 persons engaged, 9000 dependants, 7800 pieces manufactured, and their value £54,600. As this trade was conducted by persons who made the manufacture ancillary to other pursuits, such as farming, labour, &c., this circumstance may account for the large number of individuals mentioned in the return as employed. I think, however, that in this case, both individuals employed and amount of product are estimated too high. Be that as it may, it is now almost extinct, as, from the best information I can procure, it does not at present amount to £500 per annum.

In the paper alluded to no mention occurs of the worsted and stuff manufactures. This branch of the woollen trade has greatly increased since that period, and is now carried on to a considerable extent in Mountmellick and Abbeyleix, under the direction of three enterprising and intelligent firms, who spin yarn, and manufacture it, and who conduct the business in such a manner as is most likely to ensure its stability and increase. This, and the cloth branch of the woollen trade, as carried on in and about the neighbourhood of Dublin, may amount in value, at the present time, to about £200,000 per annum; the cloth trade, like that of the worsted, being principally conducted by a few firms; and these manage their business in such a way as is likely to ensure its permanent increase, they having adopted every new improvement in machinery, and generally paying less wages than are given in England for similar work.

It is on these grounds I look forward with confidence to the yearly advance of the woollen trade in Ireland; and I have no doubt but that the investment of capital to the amount of £60,000 and upwards in this country, under the direction of active and intelligent individuals, would be more profitably employed than the same sum in any part of England, owing to the cheapness of labour, particularly that of females and children, who are now engaged to a large extent in all the processes of the manufacture of cloths and worsted stuffs.

I may remark, that the duties on woollens and other goods imported from England into Ireland ceased in October, 1823; notwithstanding, this circumstance had little immediate effect on the woollen manufacture here. The trade continued with increasing activity till the spring of 1826. No doubt this was owing to the great demand for goods in England up to the panic of November, 1825; the goods imported into Ireland not being at such prices as to prevent the Irish manufacturer from competing with them. The effect of the panic of 1825 in England occasioned great reductions in the price of wool in 1826, and large accumulated stocks were sacrificed on ruinous terms. The consequence was, that large quantities of cloth were bought up, and imported into Ireland for sale. Competition under such circumstances was utterly impossible with the Irish manufacturers, and their business was at a complete stand for many months. The effect of this state of the trade was destructive to nearly all the smaller manufacturers, and ended either in their ruin or their withdrawal from business, and it was nearly two years before the larger manufacturers recovered the shock. Although the manufactories about Dublin suffered severely, the pressure was felt fully as much in Yorkshire. Before this period the prices generally paid to the workmen in Ireland were higher than those paid for similar descriptions of work in England. These high wages, however, were reduced, from the necessity of the manufacturers, to the level of the lowest wages paid in England. In about

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two years the trade began to revive, and continued, under the management of those who had capital to conduct their operations, extensive, and moderately profitable.

The wool grown in Ireland in 1821 was then estimated at 5000 bags, of 50 stones each. It is supposed to have increased since, and is now estimated at about 7000 bags, or from 300,000 to 350,000 stones, in value about £300,000, at present prices. The great bulk of this wool is exported to England, and a part to France, perhaps two-thirds, or even more; and I have no doubt but that if this were all manufactured in Ireland, it would leave to be distributed in wages for labour, and in profit, from £350,000 to £400,000. The wool manufactured by our firm is almost all of foreign growth, our manufacture being principally that of cloth; Irish wool is not suitable for any except cloths of very low price. It is, however, well adapted for every article of worsted manufacture; and this may be one of the reasons for the extent to which this branch is carried.

I am not aware of any circumstance or regulation that interferes with the successful prosecution of the woollen manufacture in Ireland; nor is there to any extent either combination or insubordination that can be seriously complained of, at least so far as our experience goes. The Irish manufacturer has access to all the markets to which the English have access; and those great marts for wool, oil, dye-stuff, and indigo—namely, Liverpool and London, are as near to him as to the others, and the facilities of communication are equal in point of despatch and cheapness. If, however, steam power is to be used, the high price of fuel is a great disadvantage to him, coals being in Yorkshire from 5*s.* to 6*s.* per ton, and in Dublin seldom less than from 16*s.* to 18*s.* But Dublin in this respect is nearly on a par with the west of England, from the high price of coals in that district.

In a local point of view, the Irish manufacturer has recently come into the possession of advantages, owing to the improved and regular communication, by means of steam boats, with almost every important part of England. He can now send his goods to Devonshire, Cornwall, Dorsetshire, and Somersetshire with more despatch than the manufacturers in Yorkshire. Such a revolution has taken place by steam communication, that many parts of Ireland are nearer to Scotland and England, for all the purposes of trade, than they are to Dublin; and Dublin is much nearer to many and important parts of England than it is to Galway, Mayo, Donegal, and Derry.

As respects the consumption in Ireland of woollen goods, it is much below that of an equal population in England. In a list of about twelve hundred names, dealers in this article, in all the towns and pleces of any note in Ireland, their sales to consumers I estimate at from eleven to twelve hundred thousand pounds. There may be other places in which woollen drapery is sold that have escaped my notice, but I do not conceive that the dealers there can be more than 100 or 150 persons, and their sales not more than £100,000. With, therefore, every allowance for such omissions, and the full estimate of the sales of all those who are known, the consumption cannot, I think, exceed fourteen or fifteen hundred thousand pounds, which will not amount to four shillings a head on the population of this country, male and female; whereas, the whole consumption of England and Scotland cannot be less than from eighteen to twenty millions of money, which, with a population of seventeen millions, would amount to upwards of a pound a head.

These circumstances show the importance of the advantages accruing to Ireland from opening by steam communication the markets of the populous and wealthy districts contained in the countries before mentioned.

I have the honor to be, Sir, your most obedient,

WILLIAM WILLANS.

Bridge-street, Dublin, *May 24th*, 1838.

APPENDIX A.

No. 9.

LETTER FROM H. BOOTH, ESQ., ON THE LIVERPOOL AND MANCHESTER RAILWAY.

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No. 9.

Leter from
H. Booth, Esq.

LIME-STREET STATION, LIVERPOOL, *9th December*, 1836.

SIR,—I beg leave to transmit you, herewith, sundry documents for the use of the Commissioners. No. 1 is an engraved map and section of the Liverpool and Manchester Railway, on a scale of one inch to a mile, with the several variations in the gradients marked in figures; by which you will perceive, that with the exception of the inclined planes up to Rainhill, and the tunnels at the Liverpool end, all which are worked by assistant power, the line is more nearly a level than any of the Railways which have subsequently received the sanction of Parliament.

No. 2 exhibits the total expenditure on the Railway and Works up to the 30th September last, classed under different heads of disbursement, amounting to £1,224,375, which is the extent of the Company's capital, in shares and loans, under the existing Acts of Parliament. Taking into consideration, however, the prospect of an increased traffic on the opening of the Grand Junction and North Union Railways, the former from Birmingham to the Liverpool and Manchester Line, and the latter, in continuation to Wigan and Preston, and the necessity, in consequence, of enlarged stations, and more complete accommodation in various ways; and adding to this the determination of the Company to relay the road with much heavier and stronger rails than those originally put down, it is evident that a further amount of capital is still required to render all complete; and accordingly, the Directors have given the requisite notices for an application to Parliament, in the next session, for powers to raise such further sums as may be required.

Nos. 3, 4, 5, 6, are four Half-yearly Reports of the Directors, with statements of the receipts and disbursements in the ordinary working of the concern, for a period of two years. We have no spare series of these Reports from the commencement, nor am I aware that they are to be purchased. The above four Reports, however, will furnish specimens of the receipts and expenditure constantly going forward; and in document No. 7, herewith transmitted, you will find an epitome of the annual receipts and disbursements in the different departments for six complete years, viz., from the commencement till the 30th September last. An important item in this annual expenditure is interest on loans, amounting for the six years to £66,000, or, on the average, to £11,000 per annum. Deducting this amount, which must be considered incidental, and which constitutes no part of the charge for the working of the road, the annual disbursements for the period referred to, amount to £54 per cent. on the gross receipts for the same period.

On contemplating this result of six years' experience in the working of the first great public Railway, it becomes an interesting question to ascertain how far this experience may safely be taken as a guide in reference to other Railways, or, for the future, in reference to our own; and if I should feel disposed to answer in the affirmative, and further to express an expectation, that with the benefit of past experience, future undertakings will be able to diminish their proportionate expenditure, I should do so from a strong impression that such will be the fact, on a general view of all the circumstances of the case (and these circumstances are both numerous and complex), rather than from actual experience having testified to any gradual decrease in expenditure, in proportion to the gross receipts. Experience has not shown such a result. Our disbursements, in proportion to our receipts, are at this moment heavier than at any former period. Another circumstance also should be taken into consideration, viz., that the traffic on the Liverpool and Manchester Railway yields a very large gross income, amounting to about £200,000 per annum, or nearly £7000 per mile; and experience abundantly proves, that a large traffic can be conducted far more economically than a small one; and hence it becomes obvious, that though one Railway, with a given traffic, yield a net income of ten per cent., it by no means follows that the same traffic divided between two Railways would yield to each a net income of five per cent.”

Some explanation, therefore, seems requisite, of the ground of my expectation, that a more economical working will obtain in future undertakings. Mainly, it is this:—the Liverpool and Manchester Railway, in reference to the formation of the road, and to all its moving machinery, is yet far from being completed. From the opening of the Railway to the present time, and, more especially, for the last 12 or 18 months, we have been in a state of transition, passing from the defective and imperfect, in form and construction, to more improved forms, and especially to increased strength in engines, coaches, and waggons.

In the original formation of the road, imperfect rails, insufficient sleepers, and inadequate draining, have been, and still are the cause of heavy and constant expenditure. Gradually, these defects are in course of being remedied; but time and money are indispensable in this process, and the work of transition from wrong to right, is yet far from being accomplished; further time will be needed, and further sums must be expended. New Railways will have a great advantage in this respect. In the formation of the road—in the mechanism of the engines—in the construction of the carriages—in every thing which constitutes the working of a Railway. They will start at a point which we have not yet reached, or only in solitary instances. Under such circumstances, and with an improved system from the commencement, it seems reasonable to anticipate, that with an equal traffic, their comparative disbursements will be less; but, as to how much less, we have literally no experience to guide us.

With reference to the broader question of the principle and system on which Railways should be established in a new country, I will trespass on your time with a very few observations.

Some preliminary points seem necessary to be settled at the outset. Are the Railways in Ireland to be considered in the light of mercantile speculations, not to be undertaken except with the prospect of a remunerating profit? or must we regard them as great and beneficial works, to be undertaken for the improvement of the country, and to be sustained by the hand of Government, where private means are insufficient? It is evident that on this latter principle, the Commissioners might suggest the construction of great lines of Railway, which, on the former principle, they would hardly take upon themselves the responsibility to recommend. Under any circumstances, however, it seems desirable to consider pretty closely what it is that is required.

A Railway is a very indefinite object; it is the kind of Railway that must, in the first place, be determined. England, with her commerce, her manufactures, and her wealth, already aims at a scale of perfection far beyond anything hitherto attained. A speed of 30 miles an hour, with the luxury of the smoothest motion which springs and cushions can afford, we have at present. But by many this is considered as the starting point; increased speed is still the aim; and it is evident that in a large class of minds improvement is anticipated in speed of conveyance, rather than in cheapness of conveyance. Probably this expectation should be modified with reference to Ireland, and that cheapness and facility of intercommunication should be the main object, rather than the attainment of an extreme speed. On the settlement of this point will depend the nature of the gradients that are to be adopted, and also very considerably the cost of the undertaking.

Much discussion has taken place on this side the channel as to the desirableness of an increased width of way; and the Commissioners, no doubt, are aware that the “Great Western” Railway Company have adopted the recommendation of their engineer, and are about to construct their road seven feet wide between the rails. The plea for this extraordinary departure from the width of way hitherto in practice is, that by the steadiness which will result to the engine and carriages from a much wider base, they will be able to use wheels of larger diameter, and thereby attain a much higher speed, with a reduced ratio of friction. To a certain extent these objects will be gained, though at a considerably increased cost. The dead weight of the engines and carriages in proportion to the profitable load will be much greater than with the ordinary width, and the cost of all sorts of vehicles will be much higher; add to which there will be more difficulty in passing round curves, and, consequently, in moving from one line of way to another, and the carriages will be more cumbrous to arrange at the different stations. The present width of way I consider hardly sufficient; but an addition of six inches would afford ample means of improving the arrangement and proportions of the machinery, as well as of giving increased steadiness, and the capability of increased velocity, to the engine and carriages.

In devising a system of Railways for a new country, it will be very important to attend to unity of design and plan, with a view hereafter to unity of management and control. This is infinitely more essential in Railways than in high roads or canals. Great Trunks, Main Lines from capital to capital, or from one principal town to another, afford the best scope for the peculiar advantages of Railways; the accommodation of smaller and intermediate places must be held subservient to the arrangements on the main line. Small sacrifices of time and distance on the part of intermediate places, in order to effect a junction convenient to the main line, are, when rightly considered, no sacrifices at all; for ultimately, whatever tends to the insuring of order and despatch along the main line, must be generally beneficial to the intermediate places. The same principle must be observed in the working of the line as in the first arrangement. The control and management must be single and absolute.

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private individuals, subsidiary Companies, tributary branches, if they be allowed to bring their engines and carriages on the main line at all, must do so subject to the rules and regulations of the higher power. This principle of action should be borne in mind on the first setting out of a new Railway.

But, perhaps, the most important point to which the consideration of the Commissioners will immediately be turned, is the economical application of the funds placed at their disposal, so that the greatest possible benefit may be derived from a certain stipulated expenditure; and the most obvious and simple rule for the attainment of this end, seems to be, to take care not to construct two main lines of Railway where one will suffice. So self-evident, indeed, and so much of the nature of a truism, is this proposition, that I should not have ventured to allude to it, if the very reverse of this rule did not seem to prevail on this side the channel; for, in England, no sooner is a certain district of country provided with a Railway, than rival lines are projected, before the first line is in operation, and before it has been at all proved, not that the first line is not sufficient, but that it is not much more than sufficient for the exigencies of the country through which it passes. With the most chivalrous disregard of consequences, and the most disinterested neglect of all sober and rational calculation, the projectors of Railways in this country are content to discuss the merits of sections and gradients, and, forgetting that no line can be a good one, where no Railway is required, to become responsible for the expenditure of millions of money, on the suggestion of an attorney, or the recommendation of an engineer. So numerous are the Parliamentary Notices of new Railways for the ensuing Session, that the London Gazette, in its ordinary forms of publication will not contain them, and extraordinary sheets are printed, and extra numbers advertised for the special purpose of receiving these multifarious announcements. The fever and excitement on this subject, pervade all parts of the country; and as yet we have no evidence of any one controlling mind, feeling the importance of taking a broad view of the whole question, and of estimating beforehand, what effect these innumerable crude and disjointed, but, in the aggregate, stupendous projects, will produce on the state of trade, on the stability of credit, and, consequently, on the general prosperity and well-being of the nation. What course Ministers will take, in these extraordinary circumstances—whether they will leave the nation to its madness, or exercise a timely control to prevent or to limit this threatened waste of the national resources, a little time will show. In Ireland the position of things is different; but even there, the contemplation of what is passing in England, may not be without its lesson; for in all countries, and under all circumstances, it is an object worthy of a statesman, to prevent the reckless waste of the national means, and to give a right direction to the public expenditure.

Considering the very important objects with which the Commissioners are entrusted, I have hoped they would excuse the foregoing observations, on the part of one who has been long connected with Railways, and is deeply interested in the subject.

In conclusion, I am desired to state, on behalf of the Directors of the Liverpool and Manchester Railway, that, should circumstances induce the Commissioners to visit Liverpool, they will be most happy to discuss with them any points, either of general policy, or of practical detail, wherein it may be thought that the experience they have had, in connexion with this and several other Railways, may enable them to afford the Commissioners the slightest assistance.

I am, Sir, your very obedient Servant,
HENRY BOOTH.

Major H. D. Jones, Secretary to the Commission
on Railways, Castle, Dublin.

APPENDIX A.

No. 10.

LETTER FROM JAMES LOCH, ESQ., M.P., TO LORD VISCOUNT MORPETH.

Appendix A.
No. 10.

Letter from James
Loch, Esq., to Lord
Viscount Morpeth.

12, Albemarle-street, *January*, 1837.

My dear Lord,—I have much pleasure in sending herewith, for your information, the papers which I promised to do, connected with the Brussels Railway, and which I got there from the engineers of that establishment, by the direction of the Minister of the Interior.

This Railway, as you are aware, has been constructed by the Government, and not by a private Company; and it is only a branch of a system intending to embrace the whole kingdom. A survey of Belgium was made, in the first instance, by intelligent engineers, in order to determine what were the general lines of Railway which should be adopted. In doing so, they had to take into consideration, not only the general features of the country, but the various relations which existed between the large towns and their more local interests and connexions.

In determining these points, they had to take into view how they affected the interests of the kingdom at large, both in its internal and external relations; and in regard to the latter, they had to examine it under a double aspect: the one being in what manner this new mode of conveyance might or might not be made to serve as a medium for facilitating the foreign commerce of the nation; the other, as it might be brought in aid of the transit trade from its sea ports to the Rhine.

It struck me, while I was at Brussels, that the course pursued by the Belgian Government, in regard to this great system of improvement, afforded the best example for the guidance of the Commission which had been named to make a similar examination of Ireland, in obedience to the address of the House of Lords to that effect; and I had a notion then of writing to you.

But I abandoned the idea when I reflected on the wide distinction that existed between the circumstances of Belgium and of Ireland, and that there were many considerations which must have guided the conduct of the engineers in the former country, which were perfectly inapplicable to the condition of the latter. Upon my return home, however, I had sent to me a printed copy of a letter from Mr. Booth, the intelligent and excellent Treasurer of the Liverpool and Manchester Railway, of which, you are aware, I am a Director, to the Secretary of the new Irish Commission. The perusal of this paper revived my desire of writing to you on this subject, and of entreating your attention to

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the Brussels Railway, and to recommend it, and the proceedings of its engineers, and the principles by which they have been guided, as well in the previous considerations as in the execution of that work, as the best example of the two for the Irish Commission to follow. This I do, both because the object of the Irish Government appears to be nearer that which the Belgian Government have in view, and also for some reasons in detail, with which I will venture to trouble your lordship.

The Belgian Railway is formed for a double line of rails; one only, however, is laid down; preparations are making to lay down the other where the traffic is greatest. I may remark, that this plan is also adopted throughout the United States, where there are already near 600 miles of railway in actual operation, and which will, before the end of this year, amount to about 1000 miles.

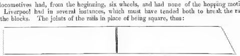
The Belgian Railway was opened between Brussels and Mechlin on the 7th day of May, 1835; on the 1st of May following it was opened from Mechlin to Antwerp. From Mechlin two lines are projected, and are in a forward state: the one is intended to diverge to the right, to Ostend; and the other to the left, to Liege, by Louvain, Tirlemont, &c. The former line has, during the course of the last month, been opened as far as Termond, and will be completed to Ghent early in the year. At a not much later period, it will be finished, in the other direction, to Liege. In this line it passes under a tunnel, at Louvain, which is in a forward state, and will have a steep inclined plane, with a stationary engine, to descend into the valley of the Meuse to Liege. It is expected that this line of conveyance will, with the consent of the Prussian Government, be extended to Cologne, by a private Company.

The inspection of the papers I send you will exhibit three particulars worthy of attention, especially when contrasted with the experience of the Liverpool and Manchester Railway—namely, the cheapness of construction, the lowness of the fares, and the great number of passengers carried. In every particular the foreign Railway excels the home one, profiting, no doubt, by the experience of the latter work. That great enterprise, in leading the way in Railway communication, has had to try experiments for all those which have succeeded it; and if it should, in its turn, have to receive instruction from its younger brethren, they must never forget how many lessons have been taught them at its expense.

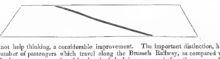
But in other respects, likewise, there are some particulars deserving of notice, in all of which the Brussels Railway appears to have benefitted by the experience of its predecessor; for example, the motion is much more equal and uniform on the Brussels Railway, and there is far less (I had almost said there is none) of that thumping which distinguishes the Greenwich as well as the Liverpool Railway. The carriages are neater within, and better finished, and they have none of that disagreeable swinging motion which the English Railway carriage has, and which is so much remarked upon. Coupled with this, the breakage of the rails amounts to nothing on the Brussels Railway, while it is so tremendous upon the Liverpool. Upon the former not above a dozen have been broken since it was opened, whereas the number upon the Liverpool amounted to 18 for the week ending 21st January, and 12 for the week preceding. It is to be observed, however, that they have not yet begun to carry goods on the Brussels Railway. The velocities on each vary very little; it is, however, in favor of the Liverpool. The original rails on this road and on the Brussels are in weight nearly the same.

They have all wooden sleepers on the Brussels, and the road appears to have a certain degree of elasticity.

The locomotives had, from the beginning, six wheels, and had none of the hopping motion that those at Liverpool had in several instances, which must have tended both to break the rails, and displace the blocks. The joints of the rails in place of being square, thus:



are diagonal, thus, so that the wheels gradually slip from the one rail to the other—



And this, I cannot help thinking, a considerable improvement. The important distinction, however, is the greater number of passengers which travel along the Brussels Railway, as compared with the Liverpool. The keys, too, are made of hard oak, baked in an oven before they are used; when driven well home they swell, and never slip and become loose as the iron keys do. Sir Charles Adair strongly recommends teak for this purpose.

It appears, that there were carried along the Brussels, as follows:—

1835, de 7m. au Mai,	33,287			
— Juin,	52,543			
— Juillet,	77.702			
— Août,	72,781			
— 7^{r},	72,522			
— 8^{r},	50,829			
— 9^{r},	33,187			
— 10^{r},	28,988	421,839	563,607	
1836, Janvier,	28,709			
Fevrier,	30,859			
Mars,	34,704			
Avril,	47,496	141,768		
Mai,	101,479			opened to Antwerp.
Juin,	98,529			
Juillet,	112,837			
Août,	119,754			
7^{r},	103,086			
8^{r},	90,440			
9^{r},	56,000			
10^{r},	49,000	731,125		

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From this, it appears, that the number of passengers carried between Brussels and Mechlin, previous to the extension to Antwerp, amounted to 563,607; and for the year 1836, they amounted to 872,893.

Compare this with the travelling on the Liverpool and Manchester Railway:—

1830, September 16th, to December 30th, - - -	71,951
1831, ,, ,, - - -	445,047
1832, ,, ,, - - -	356,945
1833, ,, ,, - - -	386,492
1834, ,, ,, - - -	436,637
1835, ,, ,, - - -	473,849
1836, ,, ,, - - -	522,991

The distance on the former is about 27½ miles; on the latter, about 30 miles. The fares are as follows:—

Liverpool and Manchester.		Brussels.	
Mails, - - -	6*s.* 6*d.*	Berlins, -	3 francs 50 cents.
Coaches, - -	5*s.* 6*d.*	Diligences, -	3 francs 50 cents.
Waggons, - -	4*s.* 0*d.*	Charzabanc, -	2 francs 50 cents.
		Waggons, -	1 franc 20 cents.

The question is, what effect have the higher fares in checking travelling. Travelling for pleasure and amusement for an artisan, is nearly prohibited by the Liverpool fares; whether they may not also interfere with travelling on business, is a consideration. The following is a calculation of the relative population of the towns on the two lines of Railway, leaving the adjacent districts out of consideration:—

	Population.		Population.
Manchester, - - -	270,963	Brussels, - - -	106,000
Liverpool, - - -	196,694	Antwerp, - - -	79,200
Warrington, - - -	19,155	Mechlin, - - -	24,000

Showing, in a still more striking light, the greater intercourse on the Brussels Railway. But nothing exhibits more the effect of low prices, than the following statement:—

The fare for travelling by the fly boats on the Paisley Canal, is $\frac{22}{40}$ of 1*d.* per mile. Previous to the establishment of fly boats, the number of passengers along the canal, was about 30,000 annually. They were, in

1831, - - - -	79,455	1834, - - - -	307,275
1832, - - - -	148,516	1835, - - - -	373,290
1833, - - - -	240,062		

You will perceive how this presses upon the Liverpool Railway, considering the lesser size of the towns of

	Population.		Population.		Population.
Glasgow, -	202,426	Paisley, -	57,466	Renfrew, -	2,833

The evidence, as to the effect of higher rates, is, I admit, somewhat contradictory, as will appear from the two following examples; for while on the Stockton and Darlington Railway, the number of travellers were not checked by raising the fares 33 per cent. on the 1st class, and 50 per cent. on the 2nd class; on the Leeds and Selby the increase of fares diminished the number of passengers. But they created a 3rd class on the Darlington, at the same time they increased the fares on the two first classes. The fares on the two Railways are as follows:—

Stockton and Darlington.		Leeds and Selby.	
		1835.	1836.
1st Class, - -	2*d* per Mile.	2*s.* 3*d.*	3*s.* 6*d.*
2nd Class, -	1½*d.* do.		
3rd Class, -	1*d.* do.		

These are average fares; some of the short distances remaining without alteration.

The number of passengers on the Stockton, average about 12,000 a month between the same termini: before the Railway was constructed, they amounted to about 320 a month. Between Leeds and Selby, taking the aggregate short fares, and calculating that they travelled the whole distance, the numbers were, before the Railway was opened, about 15,000 a-year; in 1835, they increased to 103,300; but, in 1836, they fell off to 86,558, which, however, did not diminish the income, on the contrary it rose.

These are the principal facts which I wish to place before your Lordship; and I will conclude with soliciting your attention to this consideration, whether the poorer traveller, who travels upon business, or even he who wishes to move about for pleasure, should not receive some protection from Parliament, by putting a more stringent limitation than exists at present, upon fares leviable upon that class. In many ways, unless such protection is given, great injustice may be committed, and much hardship may be imposed. It may, on calculation, be more beneficial to carry other passengers and goods, than the poorer class; and fares equivalent to prohibition may be put on; this may arise out of many combinations; but, at all events, the Railway Companies will keep up their fares to the very verge of their not loosing by the poorer classes, which may be very oppressive. And as they come for greater powers, the Legislature has a right to say upon what terms such power shall be granted. My own opinion, however, is, that low prices is that which will produce the largest income, and is the conduct the most likely to secure the favor of the public, and be the best means of keeping back competing lines.

I also send your Lordship two Acts of the Legislature of the State of Pennsylvania, chartering two Railways in that State, which you may like to see. These, and the other papers, you will oblige me by returning when you have done with them. In America the average cost of Railway is about £6,000 a mile; there they come in as substitutes for their present nearly impassable roads.

I am, my dear Lord, yours, very sincerely, and faithfully,

JAMES LOCH.

The Viscount Morpeth.

APPENDIX A.

No. 11.

LETTER FROM J. PEASE, ESQ., M.P. ON THE STOCKTON AND DARLINGTON RAILWAY.

Appendix A.
No. 11.

Letter from
J. Pease, Esq., M.P.

To the Commissioners for Reporting on Railways in Ireland.

Southend, Darlington, *12th Month, 24th*, 1836.

I should have pleasure, at any time, in contributing my quota of the information you seek on the subject, but, in the midst of many and pressing engagements, it has been disheartening to attempt the answering a letter, which, in its details, would require the time and thought which I have it not in power to bestow; indeed, weeks rather than hours would be required. I conclude my best course, and that ultimately most satisfactory to you, would be a personal inspection of the Stockton and Darlington Railway; and, I can assure you, that information and details would not be withheld to any respectable gentleman moving under your authority. The Stockton and Darlington Railway being the first of the kind (for public use and general traffic) cannot be taken as the best specimen; though I am not certain, as to its repair, management, and efficiency, or even public utility, that the Directors need yield the palm to any other party.

As public attention has been so closely turned to the subject of Railway communication, the Reports, Plans, and Acts of Parliament have long ago disappeared, having been bought up at extravagant prices. Whither to go to find them I should not know; though I have belonged to the undertaking since the first prospectus, I am literally stripped of these documents.

As regards experience, there are leading features in the system which must have struck every casual observer. For the conveyance of mineral, and heavy bodies in general, the saving in power is immense, being alike; the advantage possessed by a horse travelling on a Railway, is as 20 to 1 (level); where the traffic is from a higher to a lower level, the advantages must be still more obvious.

In laying out new lines, the necessity of avoiding partial suggestions for deviation, and also of avoiding scrupulosity, in the first construction, on the ground of expense, is evident; if the Railway answers, some one will discover the advantage of improving it; if the parties themselves attempt it, it is a two-fold charge on capital; if others obtain permission to make these deviations, they become ruinous competitors. Take, therefore, the best line at any cost not insurmountable as an objection; choose always the lowest levels wherever the gradients admit of comparison; small capitalists will easily descend with their various products; machinery and other expenses would prevent their ascending to the main line.

The quantity of heavy goods to remunerate must be large. Passengers *requiring no porterage* are the best *commodity*.

Materials, sizes, weights, strengths, lengths, breadths, must all be suggested by a knowledge of the intended traffic, nature of the country, speeds required; and any one who would lay down a universal line, might safely be compared to the jockey who should train a brewer's dray horse for Newmarket, and *vice versa*.

As an individual, I greatly regret the Legislature should have allowed the public lines of Railway to be laid down with different widths; what is gained by going beyond the old standard, 4 feet 8 inches, I cannot see, whilst immense every day difficulties must emanate from the want of uniformity.

In the preparation of iron, the size of blocks, chairs, and sleepers, every one has his own ideas. Great improvements in these, and in locomotive engines, are daily introduced, and tend, in the practical benefits which supervene, to enhance the original value of these undertakings, when discreetly laid out. This country presents the contrast most forcibly, viz.:—1st, the utter waste of property in Railway speculations: 2nd, the immense benefit derived from judicious plans, and well matured projects. I think I may fairly class the Stockton and Darlington Railway amongst the latter.

The original design has been altered, extended, enlarged, and materially varied; it consists of 54 miles, with branches included, of which about

18 miles one single way, with 400 yards double every mile.
8 miles, with 3, 4, 5, and 6 ways.
28 miles of double way.

54

Three series of inclined planes on different branches; one ascending, and one descending plane.

Warehouses, waggons, shipping staiths, where 4,000 tons per day can be shipped; engines, 26; offices, &c., cost about £450,000; present gross income, £70,000 and upwards, including haulage.

Speeds, Coals, &c.	-	-	-	6 to 8 miles per hour.
Merchandize,	-	-	-	8 to 10 miles ,,
Passengers,	-	-	-	16 to 20 miles ,,

About to be 25 per hour.

No revenue was originally expected from the export of coals; now about 400,000 tons are exported annually.

Coals for home consumption were estimated at 70,000 tons; they are now about 110,000 tons. Nothing for passengers, the gross revenue for which is about £5,000 per annum. Passengers, about £160,000 per annum. Landsale coals pay 1½*d.* dues; ½*d.* haulage; 6*d.* per ton inclined planes. Seasale coals, ½*d.* dues; ½*d.* haulage. Passengers, 2*d.* per mile, inside; 1½*d.* per mile, outside; Goods, 3*d.* to 4⅓*d.* per ton per mile.

I am, yours, most respectfully,
JOSEPH PEASE.

APPENDIX A.

No. 12.

LETTER FROM PETER SINCLAIR, Esq., TO PROFESSOR BARLOW.

Appendix A.
No. 12.
Letter from
P. Sinclair Esq.

Dear Sir,—I duly received your letter of the 27th ultimo, but have not been able sooner to give attention to the subject thereof.

Upon such Railways as we have at present to deal with in this neighbourhood, with bad joints, deflected rails, unequal supports, &c.; the risk of injury to the engines and carriages, as well as to the Railway itself, must be considered as increasing with every increase of velocity—though in what ratio, has not, as far as I know, been yet correctly ascertained. Those parts of our roads which have been relaid with strong rails (some being, I believe, 75 lbs. to the yard,) are still so far from being perfect, that the above principle will apply to them, though of course, in a diminished degree. The difficulty of stopping a train suddenly, (in case of accidents or any impediment being discovered upon the Railway, either a wilful obstruction or a stray animal,) will, of course, be materially increased by a high velocity, as compared with a moderate one; but the extent of the difficulty will very much depend upon the nature of the breaks used, and their judicious application; the liability to such accidents as may cause danger to passengers, will, therefore, bear some relation to velocity. But from all the experience hitherto had in this neighbourhood, I think we are justified in assuming a velocity of 30 miles an hour as not practically objectionable, in regard to safety upon the ordinary gradients of a tolerably straight and fairly constructed Railway; and I would not object to an attempt being made carefully to increase this speed, should the engines be found capable of doing so, consistently with what might, according to circumstances, be deemed a prudent expense. I have, of course, travelled a good deal upon the Bolton, and the Liverpool and Manchester Railways, but I have very rarely observed our speed exceeding 30 miles an hour, and never to any great extent; though I will not question the correctness of statements which I have heard of engines, without loads, having occasionally, and for a short period attained a much higher velocity.

The only objection which I feel to the use of the *same maximum velocity* upon descending slopes, arises from the increased difficulty of stopping the train in case of need; upon one of the inclined planes upon the Bolton Line, the greater part of which is of the inclination of 1 in 33, we are in the daily habit of running two or three coaches, sometimes with the engines and tenders attached upon breaks without using the rope, and I believe that the train not unfrequently attains a speed of 20 miles an hour; upon our inclined plane of 1 in 82, (a mile and a half long) we no doubt often reach 30 miles before we get to the bottom, and I knew by personal observation, that it is by no means unusual for the trains upon the Liverpool and Manchester Railway, in descending their inclined planes, to attain a similar speed. Our coaches are each provided with two powerful breaks, the one independent of the other, and each capable of *holding* the coach in our steepest inclination; with such carriages as ours, and with steady careful men, I should not deem it objectionable to use a speed of from 25 to 30 miles, in descent of such slopes as those mentioned by you, namely, from 1 in 140 to 1 in 90, but it must be kept in mind, that the number of guards or breaksmen should be in proportion to the extent of the train and the steepness of the inclination. The *expediency* of permitting such a speed would also, in some measure, depend upon the line being double or single, its straightness and freedom from impediments, such as cross rails, points or crossing plates, the liability of interruption, as from Railway waggons coming in upon the middle of the inclination, (as is the case upon the Bolton and Leigh Railway,) or from carts &c. upon common roads crossed upon the surface.

In the descent of our steepest inclined planes, when taking the rope with the train, the speed is very commonly 15 or 20 miles an hour, and often more; in this case the rope is drawn from a large drum, out of gear, but to which some degree of friction is applied by means of a break; this, and the friction of the gheves upon the inclined plane will, of course, in some measure, if not quite, counterbalance the gravity of the train; but in case of any need arising to stop the train suddenly, this must be done by the breaks on the train alone, as the breaksman at the drum, can in such case, give no assistance.

One curve upon this line, of a quarter mile radius, is probably every day taken in one direction, with all the speed the Engineers can get upon their trains, especially when heavy, with the object of surmounting the short inclinations noticed in the list of gradients formerly sent, of 1 in 100 and 1 in 200.

We have never had an accident resulting from this in a direct manner, though I have no doubt that our wheels and axles, and probably other parts of the engines and carriages, have suffered materially from it.

Several of our engines, I should notice, have now a third pair of wheels which, of course, renders sharp curves the more objectionable. I think I omitted in my former letter to state, that both the Bolton and Leigh and Kenyon and Leigh Railways have only a single line of Railway. Should it be desired (though I apprehend not) I can furnish a detailed statement of the expense of our two stationary engines, together with the ropes and gheves used upon the inclined planes. The cost of the locomotive engines is by no means so easily got at, but I may state roughly, that according to our experience here, large powerful coupled engines, including depreciation and spare engines, cost something like £2,000 per annum, for each such engine constantly working all the year round, using coke, and making pretty long days. You are aware, no doubt, that upon the Liverpool and Manchester Railway, we are obliged to burn coke; we are not so restricted upon the Bolton Line, but as our engines work indiscriminately upon both lines, they do, in fact, chiefly use coke; but we are satisfied, that if we could use coal alone, the expense of each engine would be less by £400 or £500 a-year. The expense of carriages we have found comparatively moderate, but waggons and sheets for the protection of the merchandize, have been very expensive, and we find a much greater number of them necessary than had been anticipated. There may be some 30 or 40 coal waggons in this road, (confined exclusively to this road,) and about 300 others, which work through to Liverpool or Manchester, though we make a double use of them as far as we can, by filling them with merchandize one way and coal the other.

Appendix A.
No. 12.

Letter from
P. Sinclair, Esq.

With reference to any change of dimensions, &c., in laying down Railways in Ireland, I must say I look at the proposed increase of dimensions upon the Great Western Railway as a very hazardous and costly experiment; and in saying thus much, I should state that my understanding of what is intended to be done there is, that the width of the Railway should be 7 feet, instead of 4 feet 8 inches; that the engine wheels should be 8 feet in diameter, instead of 5; and the wheels of waggons and carriages 6 feet, instead of 3. We find cranked engine axles, with journals, 5 inches in diameter, insufficient, with 5 feet wheels, having two such broken very recently; and our waggon axles very often break just within the wheels, though somewhat more than 3 inches in diameter, and with outside bearings. I quite admit the value of large wheels in diminishing friction, and also the importance of this in such a line as the Great Western, where gravity will constitute so small a portion of the whole resistance, but I have great doubt of the necessary safety being attained in wheels and axles, without incurring evils which will be more than equivalent to the good aimed at. I am not wedded to the peculiar guage of the Liverpool and Manchester Railway, 4 feet 8½ inches; and I should say that a little additional width would be desirable as regards the engines. A trifling increase (say to about 5 feet) would not, perhaps, have a very serious effect upon the axles; but as the existing lines in this country, including the London and Birmingham, and the Grand Junction, cannot be expected to alter their guage (except upon the proof positive of some great good to be gained thereby), it will be productive of national inconvenience (if I may use the term) to permit a diversity of widths; and I think, as far as experience would at present justify the increase of width, such convenience as might result therefrom would be dearly purchased. In Ireland, however, it might be well, in my opinion, to adopt some extension; though I should be fearful, with my present feelings, of going much, if at all, beyond 5 feet. In my view, any material increase of width between the rails will increase the danger of curves; and as it will be quite impossible in some lines to do without a good deal of curvature, it would be inexpedient, in a national point of view, to allow such a width to be adopted as a standard, as would throw an unnecessary impediment in the way of the system generally, or as would lead to the necessity of adopting a different gauge in any instance. An increase of space between the two lines of Railway is very desirable; and it would tend greatly to the safety of passengers getting in or out of the train were some slight fence erected at every stopping place between the two lines, of sufficient height to prevent the passengers upon one line crossing upon the other line. Of course, this would affect the expense of cuttings, embankments, bridges, &c.

From an attentive observation of all the different rails which I have seen in use, I am persuaded that a continuous support to the rail is preferable to our present mode of supporting by detached blocks or sleepers; and that if such continuous support consisted of wood, or some other material not calculated to produce the jar which we experience from stone, the road would be smoother, and less likely to injure the engines and carriages travelling thereon. In adopting a continuous support, a modification of the form of rail, of course, becomes necessary, as well as the mode of securing it. The comparative cost of stone and timber will, of course, depend upon locality. Stone used for blocks upon the London and Birmingham Railway will average, probably, 1*s.* 6*d.* or 1*s.* 9*d.* per cubic foot, while here we can procure good stone for the purpose at 4½*d.* The durability of wood is also a matter to be taken into account; and here, perhaps, Kyan's process might be of essential service, as well as in regard to all other wood work necessary upon a Railway, as in gates, fences, &c. Cassell's patent bituminous composition has heretofore attracted my attention, and was by me recommended to the London and Birmingham Railway Company as worth consideration, and perhaps trial, as a substitute for timber or stone; its capability of being moulded into any desired form without extra expense is certainly an advantage.

I have already noticed the astonishing increase of passengers resulting from the facilities afforded by the Bolton and Leigh in connexion with the Liverpool and Manchester Railway. I may notice also as regards goods, that previous to the opening of the Bolton and Leigh Railway, the ordinary charge for the conveyance of merchandise between Liverpool and Bolton was 13*s.* per ton, and that the conveyance was extremely uncertain, timber and other goods being frequently weeks on the way, though there were three modes of conveyance by canal, one into the town, and the other two coming within six or seven miles of the town. The effect of the Railway was not only to reduce the charge to 10*s.*, but to reduce the time of conveyance to a few hours; for the canal carriers, immediately upon the opening of the Railway, made arrangements by which they were enabled to deliver goods almost as quickly as we could by the Railway, and have continued to do so ever since. The reduction of the cost of carriage has, upon the quantity moved into and out of Bolton, caused a saving to the manufacturers and consumers in Bolton of £5000 or £6000 a year; and the benefit which must have resulted to the same class of persons by the facility of communication, both as to persons and goods, superseding the necessity of keeping large stocks on hand, and at the same time enabling them to meet the fluctuations in the markets, has, no doubt, been very great.

In laying out great or general lines of Railway through a country, my experience of the system generally leads me to think, that it would be extremely desirable to carry such main lines so near to considerable towns as to supersede the necessity of branches.

With reference to almost the whole of the process at present to be gone through in obtaining an Act for making a Railway, it so notoriously needs change and amendment that I need hardly say, that if the influence of the Commissioners be successfully directed to the attainment of so desirable an end, they will entitle themselves to the lasting gratitude not only of Ireland, but of the kingdom at large. It is much too well known to need comment from me, that the success of an application for such power depends not upon the merits of the case, either in a local or national point of view, but upon the extent of the influence which the promoters or opposers of the measure can directly or indirectly exercise with Members of either House. Our Judges would not be slow to express their righteous indignation were any attempt made to influence their decision, while our Senators are, by the present system, in a manner compelled to listen, with at least apparent complacency, to every sort of argument which the parties interested for or against such measures can adduce, to warp and pervert their judgment: a course into which such parties themselves are commonly forced in mere self-defence, under the knowledge that their opponents will avail themselves of such means, without hesitation. I would not have presumed to allude to this subject, but that I conceived it came within the scope of the Circular first addressed to me; and I do not now offer any suggestions in detail, assuming that the Commissioners will deem other persons much more competent than myself to do so, though I would observe merely in justification of my offering an observation upon the subject, that I have been led to do so from personal observation and experience in this sort of business for many years. I would only notice farther, as points calling for particular attention :—

Appendix A. No. 12.

Letter from P. Sinclair, Esq.

The frightful amount of expense to which promoters of Railway Bills are at present subject.

Fictitious opposition got up to such measures by interested parties, not in their own names, but in the names of landowners and others really caring nothing about the matter, or perhaps rather having an interest, if they would but see it, in promoting the measure.

Illusory lines got up as competing lines, without any intention of being ever made; of which, it is understood, there will be more than one this session.

The common habit of landowners disputing, and even opposing, merely for the sake of obtaining an excessive price for their land, notwithstanding that the measure may be calculated to confer great benfits upon their individual property.

The objection to the present standing orders, as regards future sessions, in requiring plans and sections to be lodged on the 1st March, instead of 30th November, *preceding the session in which the Bill is to be applied for*. If there be ground for believing (with the Committee of last session on Turnpike Roads), that it is desirable to put the public roads of the Kingdom under the charge of a Board of Commissioners, it may be matter for serious consideration whether it may not be desirable to extend the same principle to Railways. My own experience has forced upon me the conviction that great evil is apt to result from the diversity of interest already existing amongst Railway Companies in this country, and that the real prosperity of the country would be promoted by the adoption of *general principles*, calculated to diminish expeose, and supersede the effect of personal and local interests and prejudices.

I am, dear Sir, your very faithful and humble servant,

(Signed) PETER SINCLAIR.

To Professor Barlow, &c. &c. &c.

APPENDIX A.

No. 13.

LETTER FROM WM. CUBITT, ESQ.,

ON THE PRACTICABILITY OF A RAILWAY THROUGH NORTH AND SOUTH WALES.

Appendix A. No. 13.

Letter from Wm. Cubitt, Esq.,

London, *July 2nd*, 1838.

Sir,—In reply to your inquiries of the 22nd ultimo, as to "Whether my attention has been at any "time directed to the subject of the practicability of making a Railroad through North or South Wales, "to terminate at any one of the Harbours or Bays on the coast, which, in my opinion, might be made "available for a packet station, with a view to the establishment of a more rapid communication between "London and Dublin; and if I am acquainted with any particular line of road which offers facility "for the construction of a Railroad"—I have the honor to state as follows:—

During the last four or five years, my attention has, at various times, been called to the subject of a Railway communication with Ireland, and also to the ports or harbours most eligible for packet stations, to facilitate the Post Office communications between London and Dublin, together with the question of combining a harbour of refuge in connexion with such packet station, should a new harbour be deemed necessary or expedient for the purpose.

In the year 1836, I was requested by some parties to visit the Great and Little Orme's Heads, with a view to the formation of a harbour in the bay of Llandidno, lying between the heads, and also to inspect the country, for a line of Railway from Chester to the proposed harbour; of which a survey was made and plans prepared for Parliament, but the measure was not at that time proceeded with.

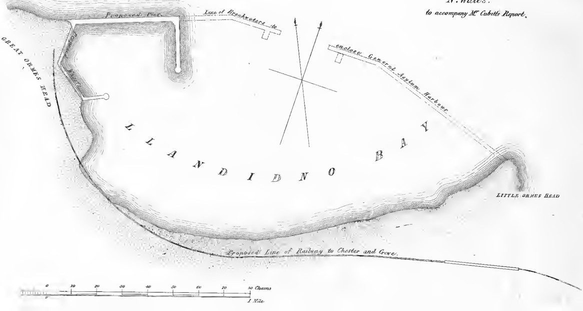
Subsequently to this, I was requested by a gentleman interested in the matter, to report to him my opinion on the proposed Railway and Harbour, which report I have appended bereto, as containing my views on the subject. (See copy of Report at the end of this communication.)

Taking into account the lines of Railway already made, and in progress, which are applicable to the object of a direct communication between London and Dublin, viz., the London and Birmingham, the Grand Junction, the Chester and Crewe; I am not aware of any project, which would carry out the measure, at so little expense, and in so short a time of transit, compared with that expense as a line of Railway from Chester to a Packet Harbour within the Great Orme's Head, although I am fully aware that a shorter sea passage would be preferable, and which can only be obtained, either from Holyhead harbour improved, or from a new harbour at Porth-Dynllaen; which latter, although I have never seen, I believe to be in the best position of any for a passage between England and Kingstown harbour, but I fear that the cost of a Railway to reach it, and the expense of a harbour, would be very great.

The next in point of less cost, would probably be a continuation of the aforesaid Chester and Orme's Head Railway to Holyhead, and improving the harbour there, so as to admit Steam Vessels, at least equal in size and power to the largest and best which now leave Liverpool; and this will most likely be found upon investigation, to be the means by which the object could be soonest obtained, and the greatest effect produced, in speed or shortness of time between London and Dublin, at the least possible cost; but the method by which the object can soonest be approximately obtained, is, no doubt, by the London and Birmingham, and the Grand Junction Railways making Liverpool the Post Office Packet Station, till such time as a shorter sea passage can be obtained, and which, I have little doubt, will ultimately be had, when it is considered, that on the average, as far as certainty and despatch are concerned, thirty miles of Railway are better than ten miles of water.

Nevertheless there is no question but that the completion of the London and Birmingham Railway will afford a vast improvement on the present time of communication between London and Dublin, *via* Liverpool, even with all the disadvantages of the long sea passage, and the delays occasioned at various times, by the unfavorable navigation at the entrance of the river Mersey.

Sketch of
St. Georges Harbour
— IN —
LLANDIDNO BAY
N. Wales.
to accompany Mr. Cubitt's Report.



Appendix A. Nº. 13. Second Report of Irish Railway Commission.

There can be little doubt, (in my judgment) that with a light train, and moderately good arrangements, the mails may be conveyed from the Post Office in London, to the Packet at Liverpool, in ten hours, so as to be at the latter place by six o'clock in the morning, and under average circumstances the same would be in Dublin by seven o'clock of the following evening; but as there are other routes which can be pointed out possessing greater facilities than that by Liverpool, I have collected the leading details of four, viz., by Liverpool, by a new Harbour at the Orme's Head in Llandidno Bay near Conway, by Holyhead, and by Porth-Dynllaen, as follows:—

	Dist. Miles.	Time. H.	Time. M.	Dist. Miles.	Time. H.	Time. M.
I.—London to Liverpool by existing Lines,	210	10	30			
Liverpool to Dublin Post Office,	126	12	30			
	336	23	0			
London to Dublin by the London and Birmingham and Grand Junction Railway,				336	23	0
Leave London 8 h. 30 m. p. m.; arrive at Dublin Post Office 7 h. 0 m. p. m., ready to forward all Letters by Mail, but not answer the London correspondence, therefore of little use to Dublin, except three hours more could be saved.						
	Miles.	H.	M.			
II.—London to the Great Orme's Head,	230	11	30			
Ormes' Heads to Dublin,	96	9	30			
	326	21	0			
London to Dublin by Chester and the Ormes' Heads, or St. George's Harbour,				326	21	0
Leaving London 8 h. 30 m., arrive in Dublin at 5 h. 30 m., giving 2 h. 30 m. for delivery, and answering of letters in Dublin for Irish business, and till 10 next morning for English business.						
	Miles.	H.	M.			
III.—London to Holyhead by extension of the Railway from Conway to Bangor and the Head,	270	13	30			
Head to Dublin,	66	6	30			
	336	20	0			
London to Dublin by Crewe, Chester, Conway, Bangor, and the Head,				336	20	0
Leaving London 8 h. 30 m., arrive in Dublin 4 h. 30 m. p. m., giving 3 h. 30 m. for delivery and despatch for Irish business.						
	Miles.	H.	M.			
IV.—London to Porth-Dynllaen, per Vignoles and Rastrick,	261	13	0			
Porth-Dynllaen to Dublin,	70	7	0			
	331	20	0			
London to Dublin by Wolverhampton and Porth-Dynllaen,				331	20	0
Giving the same time as by Holyhead.						

In the first of the above cases, viz., London to Dublin, *via* Liverpool, every thing is ready at the time of completing the London and Birmingham Railway, without incurring any expense either for new Railways, Harbours, or other Establishments, and by which route, the Mails leaving London at 8 h. 30 m. in the evening, would arrive at Liverpool at 7 o'clock the next morning; at Dublin (taking 12 hours for the passage, and half an hour for the Railway from Kingstown) at half-past 7 in the evening, being 23 hours from leaving London.

On the return passage, to London, 2 hours more should be allowed for contingencies on the sea-passage; so that to arrive in London at six o'clock in the morning, the Mail would have to leave Dublin at 5 in the morning before.

In the second case, or the route from London by Birmingham, Crewe, Chester, and to a Packet Harbour, at the Great Orme's Head, there would be required—1st, the completion of the Railway from Crewe to Chester, (the cost of which as a work now in hand I do not take into account); 2ndly, the making 44 miles of new Railway from Chester to the Orme's Head, and the construction of a harbour at that place, at an expense of about one million sterling.

By this route, the sea passage would be shortened about 30 miles, and all the intricate and dangerous navigation at the mouth of the Mersey avoided, and 2 hours' time at least would be saved in the transmission of the Mails, which, by this means, would arrive in Dublin at half-past 5 the following afternoon from leaving London, and would require to be despatched from Dublin at half-past 7 in the morning, (allowing 1½ hours for sea contingencies,) to reach London the next morning at 6.

In the third case, the route by Holyhead, it would require about 83 miles of Railway to be constructed, and such improvements made to the harbour of Holyhead as would admit, at all times of tide, that class of steam vessels most suitable for the purpose of Mail Packets; what would be the probable expense of effecting this object, it is impossible for me to say, without more data than I am in possession of; but at any rate, it could not, in my judgment, come far short of two Millions sterling on the whole.

The time occupied by this route would be twenty hours, by which means the mail would arrive in Dublin at half-past four in the following afternoon from leaving London, and would require to be despatched from Dublin at nine in the morning to be in London the next morning at six, allowing one hour above the average for sea contingencies in crossing the channel.

In the fourth case, or that by Porth-Dynllaen, there is no advantage in time over the route by the Head (supposing a line practicable in the latter direction, and to which the passage of the Menai Bridge offers no material impediment in my judgment) the land passage might be a little shorter, and the sea passage a little longer, but the latter would probably be compensated by the more favourable direction of the line of passage with the prevailing winds. The length of Railway to be made would be 135 miles, and such a harbour formed at Porth-Dynllaen, as would answer the purposes of a packet station*, the expense of which would not be very great; still the whole cost of the works, from the Grand Junction Railway, at or near Wolverhampton, to, and including the harbour of Porth-Dynllaen could not be estimated at less than three millions sterling.

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* See Lieutenant Sheringham's Report on the Harbour of Porth-Dynllaen: ordered by the House of Commons to be printed, 14th June, 1838.—Appendix A, No. 5.

Appendix A. No. 13.

Letter from Wm. Cubitt, Esq.

The relative merits of the above four propositions may be inferred from the following Table :—

No. of Route.	Route.	Distance by Railway.	Distance by Sea.	Dublin and Kingstown Railway.	Total Distance.	Probable Expense.	Time of Transit by Mail.	Time of Arrival in Dublin	Time of leaving do.	Time of Transit to London.	Time of Arrival in London.
		Miles.	Miles.	Mls.		£	Time. H. M.	Time. P.M.	Time. A.M.	Time. H. M.	Time. A.M.
I.	By London and Birmingham and Grand Junction Railways to Liverpool, - -	210	120	6	336	—	23 0	7 30	5 0	25 0	6 0
II.	By Birmingham, Crewe, Chester, and to New Harbour, at the Ormes' Heads, - -	230	90	6	326	1,00,0000	21 0	5 30	7 30	22½ 0	6 0
III.	By do. and Conway, Bangor, to Holyhead, - -	270	60	6	336	2,000,000	20 0	4 30	9 0	21 0	6 0
IV.	By Birmingham, Wolverhampton, and thence by a new Line of Railway as proposed by Messrs. Vignoles and Rastrick, to Porth-Dynllaen, - -	261	64	6	331	3,000,000	19 57	4 27	9 3	20 57	6 0

In the above computations, the travelling per Railway is taken at 20 miles per hour clear, through the whole distance, which is, I think, as much as will be effected in practice, including all stoppages, Post Office Duty, &c. &c., on the route; although I deem an average of 25 miles per hour quite possible under good regulations for the Mail Trains.

Should any one of the above routes be adopted for the conveyance of the mails, it would, in my opinion, render quite unnecessary any Mail Packets between England and Ireland, south of Dublin, inasmuch as by the means above stated the English letters for all Ireland would be despatched from the Dublin Post Office, at the usual time on the following evening, after leaving London, and thus arrive at Waterford (the present south of Ireland Packet Station,) eight to ten hours sooner than they now do by the Milford Haven and Waterford Packet; and at Wexford and all other places having the letters through Waterford proportionably sooner. And should a line or lines of Main Railway be ever established from Dublin to any parts of Ireland, the advantages to all those parts will be still greater, from making the communication between London and Dublin the best possible.

As far as Dublin itself is concerned, a saving of 12 hours will be of little or no advantage; but if the arrival of the Mail at Dublin be brought to 3 or 4 in the afternoon next after leaving London, so as to give the opportunity of answering London letters "by return" the same evening, the advantages will be very considerable; and should a velocity of 25 miles per hour be obtained on the Railways, all other things remaining the same, the arrival of the Mails in Dublin would be as follows :—

		H. M.
I.	*Via* Liverpool at	5 24 P.M.
II.	,, Orme's Heads at	3 12 ,,
III.	,, Holyhead at	1 48 ,,
IV.	,, Porth-Dynllaen	1 50 ,,

Such, on the whole, are the views which I entertain relative to this important line of communication as connected with any ulterior proceedings with Railway communication in Ireland, and that on the grand principle of uniting *Dublin* and *London* by the most expedient and best means as the two "Foci" from which all main Lines of Railway (particularly as regards Post Office communication) should emanate for each kingdom respectively.

Should there be any other points on which I can render the Commissioners either information or assistance in this interesting and important inquiry, I shall be most happy to supply the same.

I have the honour to be, Sir, your's obediently,

W. CUBITT.

To Major H. D. Jones, Secretary to the Railway Commission, Dublin.

REPORT ON ST. GEORGE'S HARBOUR AND RAILWAY.

BY WILLIAM CUBITT, Esq., C. E.

Report of Wm. Cubitt, Esq.

6, Great George-street, Westminster, 13*th February*, 1837.

Sir,—I have now the honor to submit to your notice this Report on the subject of the proposed Asylum Harbour and Packet Station in Llandidno Bay, between the Great and Little Orme's Heads, and the formation of a Railway from that harbour, *via* Flint and Chester, to the Grand Junction Railway, at Crewe; and for this purpose have been furnished with a set of the Parliamentary Plans and Sections, together with a Report on the subject from Mr. Jenkins, the engineer.

Having been called upon in a very early stage of this inquiry to view the locality of the proposed Harbour, in doing which a considerable portion of the country through which the line of Railway is intended to pass came under my notice, I do not know that I can begin my observations on the subject better than by making an extract from a brief Report which I made immediately on my return from the Ormes' Heads, viz. :—

" A spectator placed on either the Great or Little Orme's Head, and viewing the beautiful bay

Report of Wm Cubitt, Esq.

enclosed between them, cannot but be struck with the apparent ease with which a capacious Harbour might be formed between the Heads, by the construction of either a breakwater or piers, by means of the inexhaustible store of excellent materials which abound on the spot; and with the asylum that would thus be afforded to all vessels caught in gales of wind from the north-west or north round to the east, and with the probable advantages of a commercial kind which might be derived from a good Harbour at this place, communicating with the interior of the country and with London, by means of the Grand Junction Railway. A more favourable country for Railway making can hardly exist than that part of the proposed line which came under my notice, in passing from Liverpool to the Orme's Heads, viz., the portion included between Chester and the Heads, which I believe, from appearances, might be made on a perfect level."

Such were my opinions in March, 1836, and I am happy in finding them confirmed by actual survey and sections, since made, from which it appears that in the 65 miles, comprising the whole length of the Railway, from the Great Orme's Head to the Grand Junction Railway at Crewe, the gradients are as follows, viz.:—

Starting from the Great Orme's Head at 40 feet above datum, or low water of spring tides, there is—

	1	mile	falling 1 in 528
	1½	,,	rising 1 in 528
Tunnel	½	,,	level
	2	miles	falling 1 in 660
	2½	,,	rising 1 in 1320
Tunnel	½	,,	level
	2½	,,	falling 1 in 1320
	25	,,	level
	5	,,	rising 1 in 1760
	4½	,,	level
	5	,,	rising 1 in 406
	6½	,,	rising 1 in 528
	3½	,,	level
	2½	,,	rising 1 in 528
	3	,,	rising 1 in 792
	65		

Such are the levels and gradients of this line of Railway, as laid down on the Parliamentary section, and which, as regards facilities for execution and for locomotive travelling, cannot, in my belief, be exceeded by any line of the same length in the kingdom, as more than half the whole length is on a dead level, and in one instance for a continuation of 25 miles together, in which I think the whole of the cuttings and embankments will range within an average of 10 feet in height or depth. The steepest gradient on the line is 1 in 406, which, although so very favourable, might easily be merged into the adjoining one of 1 in 528, so as to bring the two into a working gradient of 1 in 456, if necessary, as the characteristic gradient, or that which will determine the maximum load, or the power of locomotive engines used on the Railway, as compared with a perfect level, and which in this case is so favourable, that in my judgment an average speed of at least 30 miles per hour may be calculated upon.

I am also of opinion that from the very level nature of the ground, and the extremely great lengths, with little or no cutting or embanking, together with the trifling interference with valuable property on the Line, that the execution of this Railway would come far within the average expense of Railways in general, but to what particular extent, or what would be its precise cost, I am unable, without going into the particular calculations, to say; but, judging from other works by way of general comparison, I am of opinion, that from ten to twelve Thousand Pounds per mile would cover the cost, provided there were no opposition and no extraordinary difficulties in the way, other than what appear on the Plan and Section.

We now come to the consideration of the Harbour, which, in my judgment, is the most important consideration of the two, inasmuch as it involves according to its plan and construction, not only the question of a mere cover and landing wharf for goods and passengers at the termination of the proposed Railway, but also that of a harbour of refuge on a most dangerous part of the coast, where a shelter of that kind is a desideratum.

Now, the term Harbour is so indefinite, that by proportioning the size to the means, a Harbour may be constructed for almost any sum of money, according to its depth, extent, &c.; and, in a case like this, where deep water is required at low water, and a capability of vessels, steam packets, and others drawing from 15 to 18 feet, lying afloat at all times, and sheltered with any wind, the expenditure must, necessarily, be considerable, although nothing can be more favorable than the proposed site for the formation of a Harbour, inasmuch as (from information furnished to me) it is deep water close to the very shore, at the points from whence the pier or breakwater would project to form the proposed Harbour; and the materials for its formation lying close at hand, and of the most favorable kind for the purpose; therefore, instead of erecting a pier with cut-stone faces to admit vessels lying alongside as a wharf, I would, in this case, recommend the construction of a rough rubble stone breakwater, or "mote," run out in an E.N.E. direction from the Great Orme's Head, in such a manner, that whilst it made part of the inclosure of the proposed Harbour for the Commercial Steam Packet "Marine," as a terminus to the proposed Railway, it would also form the proper commencement for inclosing one of the finest Asylum Harbours that can be found on these dangerous coasts.

From what I can judge by the plans and information put before me, it appears, that if a rough rubble-stone pier or breakwater be run out in a direction E.N.E. from the Great Orme's Head, for about half a mile, and then returned into the bay, with a kant of about a quarter of a mile in length, in a direction S.S.E. from the end of the first, a large space of deep water, as a Harbour, would be inclosed, under cover of which a considerable fleet might anchor quite secure from the effects of north-west, northerly, and easterly gales of wind, whilst, at the bottom of the Harbour, wharfs and quays might be formed with little trouble on the rock itself, alongside which (if my information be correct) vessels of 18 feet draught of water might be afloat at low water.

From an inspection of the sketch it will appear that by the erection of a breakwater in the proposed direction, a harbour of upwards of 100 acres in extent will be sheltered from the most formidable gales, viz., the north-west, north, and north-east; and that should it in future appear expedient to

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form a grand asylum harbour in the Bay, the northern angle of the harbour proposed in the sketch, affords the proper and ready means for the extension of the western breakwater for that purpose, which, together with an eastern breakwater from the Little Orme's Head, would form one of the finest, and, in my judgment, next to the proposed harbour of Port William, on the north-east coast of England, one of the most useful asylum harbours that could be constructed in His Majesty's dominions.

With regard to the cost of a commercial harbour and packet station of the form and dimensions I have suggested above, I am of opinion that £150,000 will form the breakwaters to the extent I have mentioned, and make convenient wharfs and landing places at the termination of the Railway.

How far the above outlay will be balanced by the advantages to be derived from a Commercial and Asylum Harbour at this place, capable of receiving from 50 to 100 sail of vessels at all times of tide in the most adverse weather, and with a direct communication of the very best kind with London and all the north and east parts of England, by means of only 65 miles of Railway, will be for those to judge who best understand such subjects; I can only again state that in my judgment all the above advantages together with a safe and uninterrupted communication with Ireland, *via* the noble harbour of Kingstown, may be obtained by the expenditure of a sum within or not exceeding one million sterling, nor am I at present aware of any combination of Railway and Harbour, where all the like advantages, present and prospective, could be obtained at the same expense.

I have the honor to be Sir, your most obedient Servant,

(Signed) W. CUBITT.

APPENDIX A.

No. 14.

LETTERS FROM P. MAHONY, ESQ.

RELATING TO THE PROJECT OF ESTABLISHING A RAILWAY THROUGH THE PROVINCES OF LEINSTER AND MUNSTER.

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No. 14.

Letters from
P. Mahony, Esq.

To Major H. D. Jones, R.E., Secretary to the Railway Commission.

Sir,—I have had the honor of receiving your letter of the 10th instant, apprising me of the desire of the Railway Commissioners to receive information as to the views which have led to the project for establishing a Railway, to proceed from Dublin, through the provinces of Leinster and Munster, and to terminate at some judiciously selected harbour on the south-west coast of Ireland, suitable for a general packet station; and I have, without delay, laid your letter before the very respectable individuals by whom the project in question has been brought forward, and who are still—from a thorough conviction of its immense importance—determined to continue their best efforts for carrying it into practical effect.

It is indeed no small cause of congratulation to them, and one, too, in which I may be permitted to add, that I cordially participate, to find that a project which we have collectively so long and so anxiously cherished, and to which we have looked forward as, beyond most other means, calculated to accelerate the improvement of Ireland, should now be taken into the favourable consideration of Government.

That this gratifying result should ultimately occur, we never permitted ourselves to doubt. It would, in fact, seem only necessary to reflect for a moment upon the changes which have taken place, within the last century, in the leading commercial relations of Europe—the rapid increase of population, and of wealth, throughout the American continent, and the inevitable augmentation of the direct intercourse, not only of the United Kingdom, but of the rest of Europe with that quarter of the globe—in order clearly to perceive that the position of Ireland, in relation to the future commerce both of Europe and America, has undergone the most important change, and that if it be not our own fault, we must hereafter occupy the very foremost post,—the most favorable point both of departure and arrival, in the direct line of communication between these two great continents.

The immense advantages which Ireland must realise by the adoption of any measure which shall secure to her the full benefit of such a change, do not require to be enlarged upon; they are, in fact, self-evident: but when, in addition to these, we recollect that our fortunate geographical position equally points out the propriety of rendering some one of the numerous harbours on the south-west coast of Ireland, the packet station for the intercourse of the United Kingdom with the Mediterranean, and the west and south of Europe, and ultimately, perhaps, with the East Indies, the mind cannot fail to be struck with the prospect which such a combination of fortunate circumstances opens for the future improvement of Ireland. Allow me to add, that the views thus suggested will best explain the motives which have led to the project under consideration, and I cannot doubt will satisfactorily justify the unwearied anxiety and earnest perseverance evinced by its promoters.

In order to place its present position fully before the Commissioners, it becomes necessary to revert to the circumstances under which the idea of forming a line of Railway, in the direction and for the purposes referred to, was first entertained. Its original suggestion is admittedly due to my friend, Mr James Pim, jun., Banker, Treasurer to the Dublin and Kingstown Railway Company, and occurred in 1833. It was more prominently, again brought forward by Mr. Pim and his colleagues, the Directors of the Kingstown Railway, in the year 1834, about the period of the completion of that important undertaking, and had its rise in a natural and obvious wish, that the facilities of a mode of communication so desirable, and the advantages of which the public (after a long period of hesitations and distrust on the one hand, and of direct and avowed opposition on the other,) was slowly beginning to appreciate, might be extended to other districts adjacent to Dublin; and it appeared on the first consideration of the subject, that the direction of such a line as would be most beneficial to the public, and hold out the best chance of remuneration to parties embarking in it, would be through the counties of Dublin, Kildare, Queen's County, and Tipperary, to terminate between Cahir and Cashel, so as to connect itself with the projected line from Limerick to Waterford, for which an Act of Parliament had been obtained in the year 1826; and possibly, at some future period, to be extended to Cork.

Various suggestions were offered, some with a view to the limitation of the line thus contemplated, but in no case with any idea of extending it beyond the districts already mentioned. About this period, however, Mr. Cubitt, the well known engineer, happened to be consulted; he expressed his entire approbation of the project, and the principles upon which it was proposed to found it; but suggested that it should be extended, so as ultimately to terminate at a harbour on the south-west coast, suitable for a general packet station. In favor of the adoption of these views, he urged the advantages to arise, in a financial point of view, from making this, instead of a mere *Irish* project, an *Imperial* one; the parties promoting it, being therefore justified in expecting a larger amount of public aid, on account of the greater general usefulness, and immense national importance of the undertaking, than could be at all hoped for if it should continue to be based on the circumscribed limit at first proposed. He argued that the vast national advantages thus to be obtained, instead of diminishing the facilities and benefits of a merely local nature, would, on the contrary, greatly increase them—that the line of Railway, passing about midway between the Channel on the one hand, and the Shannon Navigation on the other, while it in no degree interfered with the existing Canals and the Barrow Navigation, (an object to be most sedulously kept in view,) would afford, to almost every town of importance in the south-west of Ireland, the opportunity of being connected with it by branch lines.

It was also urged, that such a direction embraced both the Tipperary and Cork coal fields, whilst, from one extremity of its course to the other, it pervaded that immense limestone district which forms the great geological feature of this portion of the island.

The plan thus suggested by Mr. Cubitt, however startling, in consideration of the magnitude of the objects, the distance of the proposed terminus, the certainty that a large portion of a line so extended must for years be comparatively unproductive, and the expense which its construction, in the first instance, necessarily involved, was, at the same time, so marked by its decision, perspicuity, and simplicity, that the promoters of the undertaking were powerfully impressed with the necessity of affording it, at least, the most ample consideration.

It became, subsequently, a topic of very general discussion in the public prints, not only throughout the United Kingdom, but in the Colonies, the United States, and on the Continent of Europe; and it was every where hailed with an unanimous—I might almost say, an instantaneous expression of the approbation of all classes.

The result of these discussions, and of their own matured consideration of the whole question, was to satisfy the parties to whom it had been first suggested, not only of its immense national importance, but of its entire practicability; and they at once determined to ascertain how far the public would be disposed to sustain the project, by opening a subscription list, for the purpose of raising, by voluntary donations, and without reference to any future interest in the undertaking, the necessary funds to defray the expense of a preliminary survey. This appeal was promptly responded to, and large sums were at once placed at their disposal.

It was not thought advisable to proceed at once to a minute survey of the line: a general inspection of it was, however, undertaken by a competent engineer, the result of which fully justified the favourable opinions previously entertained, as to the entire practicability of the project; and I have reason to be assured, that the investigation thus made, and the principles on which it was conducted, are calculated materially to facilitate the future minute survey of the line, whenever it may be determined upon.

In this stage of the proceeding, it was first deemed right to seek for the sanction of the Government; and in the month of October, 1835, a deputation, headed by the Duke of Leinster and the Earl of Wicklow, waited upon Lord Morpeth, in the absence of His Excellency the Lord Lieutenant, to solicit his countenance and support. They were very favorably received, and it was arranged that in the course of the ensuing summer, and as soon as funds to defray the *entire* expense had been obtained, a survey and general examination of the proposed line should be commenced, under the immediate superintendence of the Board of Works.

Some unavoidable delay occurred in the accomplishment of this important preliminary proceeding, in consequence of the Parliamentary engagements of the engineer; and, in the progress of the late session, when, in consequence of the urgent representations made to the Government by the most influential friends of the measure, it appeared highly probable that an effective inquiry into the merits of the project would be instituted, either by the issuing of a Commission, such as that now constituted, or in some other authorized and official form, it was deemed advisable by the promoters of the object to allow it to lie over, and to await the progress of these events.

It is not denied, on the contrary, I feel it only due to the parties whose interest in this case I am called on to represent, earnestly to impress the fact upon the minds of the Commissioners, that manifest and tempting inducements were held out to them to bring the project at once before the public—to establish a Company for carrying it into effect—to issue shares whereon deposits should be promptly paid down; and, in this way, at once to pre-occupy the ground, and to preclude any other or competing projects from interfering with the undertaking.

It cannot be for a moment doubted, that the project, under the peculiar and exciting circumstances of the time, would have been highly attractive, and that the requisite number of shares would have been at once subscribed for. A directly opposite course was, however, determined upon, and, in a Prospectus, which was then circulated by the parties interested in the undertaking among their own immediate friends, they stated their views and intentions in the following terms:—

"Under such circumstances it might now be considered desirable to form a Company to co-operate
"in carrying these important objects into effect. To such a course there are, however, strong objec-
"tions. The project is so vast, and hitherto so little examined, that the prudent or the timid would
"probably be deterred from joining in it; whilst it cannot, on the other hand, be denied, that there
"is an undue excitement in favour of any Railway project, which would greatly facilitate the
"formation of such a Company, but of which its promoters have no wish to avail themselves. They
"would suggest a different course. Funds will be required to promote the careful and minute

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Letters from
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"inquiry which they wish to institute; and it will be readily admitted, that if the result of those "inquiries and surveys should be satisfactory, and that Government should be willing to afford that "amount of assistance which the great importance of the work would manifestly call for, any "advantages which may arise from such inquiries and survey, should be open to those by whose "exertions, and at whose expense, they have been conducted.

"It is proposed, therefore, to open a Subscription List, the subscribers to which shall have the "option of becoming proprietors in the Company (if any shall ultimately be formed) in proportion to "the sums they may respectively subscribe, or of receiving back their proportion of any balance which "may remain, after defraying the expenses."

About the period when this document was prepared, but before it had been put into extensive circulation, the meeting of noblemen and landed proprietors, interested in the improvement of Ireland, which was held at the Thatched House Tavern, took place. On that occasion the Duke of Leinster presided, and, in the series of resolutions which were then proposed and carried, the ground was laid for the subsequent appointment of the Committee of the House of Lords, to inquire into the whole subject; and for the Resolutions and Address moved in that House by the Marquess of Lansdowne, in accordance with which the present Commission has been appointed. These circumstances, however, only the more strongly confirmed the promoters of the measure in the course they had previously determined to pursue. The Prospectus referred to was finally withdrawn, and they resolved that the whole project should be unreservedly submitted to the Commission, confident, as they still feel, that the decision of the Commissioners must be favorable, and that the project thus sanctioned, and thereby entitled to the full support of the Government, cannot fail to be completely successful, and to remain, throughout all future time, an enduring testimonial of the determination of the Legislature and the Government, to promote, by every means within their power, the future prosperity of Ireland.

A consideration of the circumstances thus detailed, will, I think, enable the Commissioners clearly to understand the position in which this important subject at present rests. On the part of the highly respectable individuals by whom it has been so far prosecuted, I am free to repeat the expression of their determination to urge it forward by every means within their power, as well as to afford to the Government their entire and cordial co-operation in every measure which may appear calculated to accelerate its progress and promote its ultimate success. They conceive, that in the present instance, they cannot more effectually do so than by placing at the disposal of the Commissioners the sums which have been already contributed by themselves, and by various noblemen and gentlemen, who, at their instance, have liberally subscribed to the fund in their hands, for the purpose of completing the survey of the line as already mentioned.

Assuming, therefore, that such a proceeding comes within the scope and intent of the Commission, my friends direct me to convey to the Board their earnest and respectful request, that the survey so long contemplated, and which has been commenced under the circumstances I have already mentioned, may now be undertaken with a view to its immediate completion, under the direction of the Commissioners, but, of course, at the expense of the parties promoting it; and, in this view, I am directed to state, that they are ready to pay into the hands of the Commissioners the sum of One Thousand pounds, and to render themselves accountable, in any way satisfactory to the Commissioners, for any further sums which may be found necessary.

It is not the least satisfactory consideration, arising out of the nature and terms of the Commission, that its great twofold object, namely, first to ascertain the best system, and most advantageous Lines of Railway, combining the greatest public accommodation with the smallest outlay; and, secondly, to fix upon some port, the most eligibly circumstanced as a general packet station, should both be combined in the project under consideration; a circumstance which I believe I may venture to assume, pertains to it exclusively, and will not be found to enter into the condition of any other of the proposed lines. In this view of the subject, the result of the south-western survey must be wholly to dispose of the second object contemplated in the Commission, and, at the same time, to accomplish a very important portion of the first; and I would hence venture, on the part of my friends, as well as myself, to express our earnest hope that the Commissioners may be induced to give to this particular department of the inquiry, if not their very first, at least a very early share of their attention.

About the beginning of the present year, when it was determined by the parties interested, that the project should be distinctly brought forward, they drew up and published a short statement, in the shape of a small pamphlet, in which they endeavoured to place the whole question in a clear and succinct form before the public.

As this brief avowal of their views and intentions (and of which I beg leave to place copies herewith in the hands of the Commissioners), was very fully considered, and as there is no part of its contents which the parties have since found reason to retract or disavow, I may, with the more confidence, request the attention of the Commissioners to it.

The leading object of the publication is to point out the immense advantages which would result to Ireland, from rendering a harbour on our south-west coast the point of departure and arrival, in the intercourse, not only of the United Kingdom but of Europe, with the great American continent. This subject was considered, not alone with reference to the formation of a line of Railway from Dublin to the south-west extremity of the Island, but also with reference to the formation of similar lines in Great Britain, subsidiary, at least as regards European intercourse, to the great Irish line, and virtually in connexion with it; and especially to one, then first projected, to pass from London to Porth-Dynllaen in North Wales, whereby it was assumed as possible that the distance between the capitals of the two countries might be reduced to about fourteen hours, and the whole distance from London to a port at the extreme south-west of the United Kingdom, might be accomplished in about twenty-two or twenty-four hours; and it is most satisfactory to be now enabled to state, that this proposed line to Porth-Dynllaen has been minutely surveyed by two eminent Railway Engineers, Charles Vignoles and J. U. Rastrick, Esqrs., who have reported, that a Railway for the accomplishment of this object, by connecting Porth-Dynllaen with the great Birmingham and London Line, is not only practicable, but that the cost of its construction, through a country apparently so difficult, will be rather under than over the usual average cost of modern Railways, and will not exceed two millions sterling. That the distance from London to Porth-Dynllaen will be about 260 miles, and that as the experience to be acquired, previous to such a Railway being completed, may be calculated as insuring a speed of 30 miles an hour throughout, it may be fairly assumed, that the time of transit will not exceed nine hours.

Of this Report I beg leave to annex a copy, together with a supplementary Report by Mr. Vignoles on the subject of a line direct to Holyhead, which he had also been afterwards employed to survey; and a third Report on a contemplated branch line from near Llangollen to Chester.

The Commissioners will no doubt have been aware, that in pursuance of an address from the House of Commons, a survey of the harbour of Porth-Dynllaen has been made under the direction of the Lords of the Admiralty; and it is most satisfactory to know, that the Report officially made to their Lordships, by the officer to whom this duty was intrusted, is highly favorable.

The second object contemplated in the publication referred to, was to satisfy the Government and the public of the great and manifest advantages which would inevitably result to the Post Office department from the establishment of the proposed Packet Station and Railway—especially when taken in connexion with the great line from London through North Wales. In support of this position they have cited several Official and Parliamentary documents, to which I can only ask the attentive reference of the Commissioners. These documents, it will be seen, refer not only to the correspondence with the North American Colonies and the United States, but also with the Mediterranean and the South of Europe; and have the strongest possible claims upon public attention, not only in reference to the immensely increased facilities which the success of the project in question would afford to all public and commercial correspondence, but from the great increase of revenue which must inevitably be derived from it, and which, on the grounds already referred to, is estimated at not less than £200,000 yearly.

Another subject referred to, and offering considerations of the highest public interest, is the manifest economy to arise out of the success of the project, by means of the facilities to be thereby obtained in the periodical removal of troops, and in the transport of naval and military stores, to and from our North American Colonies and the West Indies; as well as the immense advantages which must arise, in the event of the country being unfortunately engaged in foreign warfare, from possessing a harbour at the extreme western point, not only of the United Kingdom, but of Europe, which, by means of the projected Railways, would be placed within twenty-four hours' distance of the seat of Government, and upon which a large proportion of the military force of the country could thus be accumulated at all times, not only in the course of a few days, but, comparatively speaking, in a few hours.

The publication in question then proceeds to a consideration of the advantages of a more local nature which would result from the success of the project: it dwells upon the manifest benefits which would result to this portion of the empire from the influx of strangers and travellers, and the knowledge thus to be acquired and diffused of the natural capabilities and resources of the country, whether for agriculture, commerce, or manufactures; and it afterwards enters upon the important discussion of the various circumstances and interests, a judicious combination of which, under a wise and economical direction and management, can alone insure the final and perfect success of the undertaking. It dwells especially upon that great leading proposition, which it is pleasing to see the constitution of the present Commission so clearly asserts, and is so well calculated to work out, namely, the full development of the Railway principle, by directing it to channels wherein the greatest possible amount of advantage shall be attainable with the smallest possible outlay; a principle which the project in question is, in the unanimous opinion of its supporters, beyond any other which has been hitherto brought forward in any part of the United Kingdom, calculated to work out, and to exhibit as most eminently successful.

It is indeed highly gratifying to my friends to observe, that, in the interval which has elapsed since the publication in question, and during which the Railway system has been more attentively and more rigorously examined than at any former period, the several statements which they had then made, have been, in every instance, entirely authenticated, and that the conclusions at which they had arrived have been fully confirmed.

To one point to which their attention has been since directed, they trust they may, without impropriety, make a passing reference.

A very strenuous and rather clamorous opposition has been raised against the project of at all removing the general packet station from the extreme west point of England to that of Ireland. It is not denied that it was for the interest as well as the convenience of England, previous to the Union, (while each country had its separate, and virtually its rival Post Office establishment,) that *her* great general packet station should be placed at the etreme south-west point of her coast. If it were the *interest* of England, separately considered, to sustain the *principle* by the *practice* in question, it is manifestly the interest of the United Kingdom to follow out the same principle, and to place our great transatlantic packet station at the extreme south-west point of our territory as now constituted; any other course would involve an abandonment, either of the principle that the national packet station ought to be the extreme south-west harbour, or of the whole spirit of the union between the two countries.

Since this letter was commenced, I have been informed, and have not failed to put my respectable friends in full possession of the fact, that a project has been submitted to the Government and to the Commissioners, under circumstances which claim for it a high degree of consideration, by which it is proposed, that the great line of Post Office communication should hereafter be, not from Porth-Dynllaen to Kingstown, as originally suggested, but from the former port to the harbour of Wicklow.

It is within the recollection of some of my friends, that when the change in the Welch Post Office Packet Station was first suggested, now more than twenty years ago, it was also proposed that Wicklow should be the station on the Irish side of the channel, as affording the safest as well as the shortest line of transit, and that the advantages likely to result from such a change, were deemed by eminent engineers of that day highly important.

Should this change in the intercourse between the countries be now recommended, or should it ever be considered as likely to take place on some future occasion, it cannot fail to strike the Commissioners how important would be the change thereby produced in the relative position of the Kingstown Railway, as connected with the great project of a South-western Line and Packet Station. The extension at present contemplated to Bray, would naturally be pushed forward by the coast to Wicklow; and in the great line from the Post Office Station on the east coast, to that on the south-west, the Dublin and Kingstown Railway, instead of being merely one extremity of the line, would become an intermediate station of the greatest possible importance, and wholly indispensable for carrying this great national undertaking into complete effect.

Under such circumstances, I venture, though with much diffidence, to suggest to the Commissioners, how great would be the importance of a due regard to the level at which a great West or South-west

Appendix A.
No. 14.

Letters from
P. Mahony, Esq.

Trunk Line shall arrive at its point of termination on the west side of Dublin, and the difficulties which may otherwise hereafter arise, as to its being connected with the existing line to Kingstown, and the contemplated extension of that line to Bray and Wicklow.

I have the honor to be, Sir,
Your very faithful and obedient servant,
PEIRCE MAHONY,

Solicitor for the Directors of the Dublin and Kingstown Railway Company, who form the Provisional Committee for the formation of the proposed Railway Company.

43, Dame-street, Dublin,
2nd December, 1836.

43, Dame-street, Dublin, *May 19th*, 1838.

Sir,—Having reason to suppose that the Report of the Railway Commissioners for Ireland, is about to be submitted to Her Majesty's Government, I have been requested respectfully to call the attention of the Commissioners to my letter, addressed to you under date of 2nd December, 1836, stating the views and proceedings of the parties on whose behalf I then addressed you, as I now again take the liberty of doing, in reference to a Main Trunk Line of Railway to the South-west of Ireland.

It has been the object of these gentlemen, as their entire course of proceeding must have fully demonstrated, to abstain from all effort to discuss or to introduce Railways into Ireland, until the decision of Her Majesty's Government, founded upon a full consideration of the Report of the Commissioners, should be made known.

Many opportunities for carrying the views of the parties into effect were open to them, both before and since the appointment of the Railway Commission, arising from the peculiar excitement relative to such speculations; yet they have not attempted to avail themselves of any, for they have been long since convinced of the impossibility of Railways, on an extended scale, ever being successfully conducted in Ireland, unless they shall be planned with the greatest care and caution—approved of by the Commissioners, and sanctioned by the Government.

In taking this course, it must be manifest to the Railway Commissioners, that the respectable parties I have the honor to represent, have deviated, in a marked degree, from the conduct of others, who entered, as rivals, upon their projects of improvement in this country, after these projects had been laid open by them to the public and the Government.

From the outset of their exertions, the chief object of my friends has been to lead the public into those measures which would be productive of the largest amount of national benefit, and they have cautiously avoided every temptation to acquire individual profits at the expense of those views of general improvement which may hereafter be effected by the introduction of a well digested system of Railways in Ireland: a system they can, with no mean feelings of pride and satisfaction, claim as having been altogether first promulgated, as the proper course, by themselves; and as having been by them first illustrated several years ago, by the proposal of a Main Trunk Line of Railway from Dublin to a Packet station on the south or south-west coast of Ireland.

Under these circumstances I am requested to inform you, that the same gentlemen are only waiting for the guidance which the Report of the Commissioners will afford them, at once to proceed in the execution of their original project. It was with this view, and in reference to this object, that they submitted, in December, 1836, the detailed statement of their previous proceedings, then laid before the Commissioners; and for the same reasons, and in order to do full justice to their views and conduct—to prevent them from being hereafter charged with coming forward, as mere speculators, to carry into effect the recommendations which your Report may contain—as well as to put the Government and the Public fully in possession of all the circumstances of the case, I have respectfully to request, that the Commissioners will be pleased to notice the communications which I have so had the honor to lay before them, and to express a confident hope that those communications may be added to the Appendix to the Report of the Commissioners, as documents not altogether uninteresting, and to which the Public may hereafter usefully refer.

I have the honor to be, Sir, your faithful Servant,
PEIRCE MAHONY.

To Major H. D. Jones, &c., &c., &c.

APPENDIX B.

No. 1.

OBSERVATIONS

RELATIVE TO THE

REGISTRY OF TRAVELLING AND TRAFFIC,

MADE BY ENUMERATORS,

AT THE PRINCIPAL TOWNS ON THE ROADS BETWEEN DUBLIN, LIMERICK, AND CORK,

BY ORDER OF THE RAILWAY COMMISSIONERS,

IN APRIL AND MAY, 1837.

Appendix B.
No. 1.

Registry of Travelling and Traffic.

Naas,
6th April, 1837.

1. Naas.—The enumeration in Naas comprises all the carts and travellers approaching Dublin, or proceeding from it, on the road leading by Athy to Kilkenny, Queen's County, Tipperary, and Cork; but a portion of the carts and travellers by Carlow, do not pass through Naas, and approach Dublin, or leave it, on the road by Blessington and Baltinglass; and the greater part of the loading on the Limerick road west of Naas, is carried only to Monasterevan, from which the commodities are conveyed by canal to Dublin.—(See Monasterevan, Mountmellick, Maryborough, and Mountrath.)

Pigs and sheep approaching Dublin through Kilcullen, are turned off at that town by the Blackchurch road, avoiding Naas; and those approaching it through Monasterevan, are turned off at Kildare, and driven to Dublin through Prosperous, Clane, and Leixlip. This is done to escape some of the turnpikes on the Naas road, the charge being ½d. for each pig, &c. (See also, pigs by canal from Monasterevan.)

Corn is carried from Naas to Dublin principally on carts, by jobbers, whose number has been largely augmented within the last six years. Before the increase of jobbing dealers, there were between three and four thousand barrels of corn sent to Dublin weekly, by canal. One trader in Naas then employed two boats in the trade; but now he does not send more than one thousand barrels in a year.

The corn market of the town has declined within the same time; markets having been established in Dunlavin, Blessington, Ballymore, Robertstown, and Newbridge, to which corn is taken that would otherwise be sold at Naas.

Kilcullen.

2. Kilcullen.—The number of carts on the road through Kilcullen, receives but little accession from the trade of the town, which is very trivial. There is a good corn market during the season, but the principal buyers are jobbers from Naas.

Athy.

3. Athy.—All the heavy loading for Athy, except timber, is brought from Dublin. Timber is brought up the Barrow. The tolls on the Barrow have been lowered, to encourage an extension of trade.

Notwithstanding the canal communication with Dublin, much of the heavy loading from it is conveyed on carts. Nine carts are employed by the trade between the town and Dublin.

Monasterevan.

4. Monasterevan.—Inquiries were made at Kildare to ascertain whether any considerable traffic is carried on between it and Dublin, which is not registered at Naas, for the reason given in the observations on that town. The wheat sold in Kildare is bought for the mills near it; the barley is bought for Monasterevan, and the oats for various millers. There is no sale of butter, pigs, or sheep, except at fairs, more than is required by the local demand; therefore, the traffic to Dublin receives little or no accession from Kildare, and the pigs or sheep which are turned off the Limerick line of road between Monasterevan and Naas to avoid turnpike charges, must all, or nearly all, be registered in Monasterevan.

A large portion of the traffic on the Limerick line, stops at Monasterevan. Flour and meal are carried here from Maryborough, &c., and placed on the canal boats for Dublin. Pigs, &c., too fat to walk the whole way to Dublin, are also put into the boats here.

Mountmellick.

5. Mountmellick.—The difference between the number of boat passengers at Mountmellick and Monasterevan, will show the accession received at Portarlington and the latter town. Portarlington is only a very short distance from the canal, and a car is driven through the town every morning to take passengers free to the boat; and it is in attendance, on the arrival of the boat from Dublin, to take passengers free to the town.

A large portion of the corn sold in Mountmellick, is bought for mills, breweries, &c.; but there is also a very active trade by jobbers from the county of Kildare.

The local manufacturers have their own delivery carts.

There are only two carriers constantly employed between the town and Dublin, taking up butter, rags, &c., and returning with general loading for the shops.

A large quantity of wool is sent to Dublin on carts.

Notwithstanding the canal communication with Dublin, very little coal is used here or at Portarlington.

Appendix B.
No. 1.

Registry of Travelling and Traffic.

Maryborough.

6. MARYBOROUGH.—Passengers are taken from Maryborough to Mountmellick for the canal boat, and an enumeration of them is made. They are taken on a mail car of Bianconi's, passing through from the county of Kilkenny.

The canal company provided a car for taking passengers free, to and fro, for some time; but it failed to be remunerative, and was discontinued about three months ago.

The carrying trade in grain is never very active here. Wheat is all bought for millers near the market: a portion of the barley, however, and the greater portion of the oats, are bought by jobbers, and carried towards Dublin or Carlow.

Heavy loading is brought to this town from the canal, and the carts coming thence are registered.

Flour from the town is sent to the canal for Dublin; and the carts taking it are also enumerated.

Mountrath.

7. MOUNTRATH.—Flour and meal are brought from Mountrath to the canal for Dublin; and heavy loading from Dublin is obtained by the canal. The carts with both are enumerated. Cotton wool is obtained by land, as well as other loading.

The canal company provide a car to take passengers free, to and from this town, for the boat, every day; and the number is included in the enumeration.

Thurles.

8. THURLES.—There are two lines of road from Thurles to Dublin; one by Templemore, Rathdowney, and Mountrath, which is the stage coach route; and the other by Urlingford, Durrow, and Athy, which is the general route for carts.

There is an extensive cross trade from Killynaule to Templemore, Roscrea, &c., in culm.

There is a very great corn trade from this town to Clonmel: there is also a trade with Limerick.

Cashel.

9. CASHEL.—The principal carrying trade from this town is on the southern line; but there is a considerable traffic with Limerick. Carts take culm there, and return with timber, iron, English coal, salt, &c.

During the corn season there is a great traffic on the line through Cashel, from Thurles to Clonmel.

Tipperary.

10. TIPPERARY.—The corn trade from Tipperary is divided between Clonmel and Limerick: the principal trade in oats is to Limerick.

The butter trade is very extensive during its season, commencing in May.

Farmers in the neighbourhood of tha town take their produce (frequently) to Clonmel, or Cashel and Limerick. Jobbers have, however, the principal carrying trade.

Limerick.

11. LIMERICK.—The principal carrying trade from Limerick is on the road to Tipperary; and the principal travelling is on the Dublin road. The carrying on the Cork road is confined to county Limerick farmers conveying their produce to market, or is that occasioned by the trade of Kilmallock, Bruff, and Charleville: it would not, therefore, add to the business on a Railway communication between Limerick and Cork, by Tipperary. Travellers, however, on the present road to Cork, might avail themselves of such a Railway, if going either to Mallow or Cork. It is, therefore, necessary that the travellers on the Cork road should be enumerated; but a registry of the carts, pigs, &c., would be of no utility.

A portion of the pigs driven to Limerick from the north of Tipperary county, are turned off the Dublin road at Killaloe, and brought on through Clare, to avoid a turnpike charge of ¾*d.* on each. However, these are from a district between the mountains and the Shannon, and, therefore, should not be introduced into an estimate of trade for a Railway to Limerick, the line being eastward of the mountains.

Mallow.

12. MALLOW.—The carrying trade of Mallow is principally on the road between the town and Cork: a small portion is on the road to Mitchelstown, and a portion of the travelling.

Mitchelstown.

13. MITCHELSTOWN.—A portion of the travelling between Dublin and Cork is through Mitchelstown. The Mallow road from Dublin also passes through; but on the latter, very few carts (within the scope of the instructions,) are to be seen. The principal travelling is to and from Cork. Much of the agricultural produce sold in the market of the town, is sent to Youghal, and a great proportion to Fermoy. Coal is brought to the town from Youghal, which is nearer than Cork; but timber and iron are obtained from the latter, as well as general merchandize. The loaded carts from Mitchelstown to Youghal, go by Fermoy. Carts not loaded, going for coal, are turned off the Cork line at Kilworth.

Fermoy.

14. FERMOY.—The agricultural produce bought in Fermoy market, is sent, for the most part, to Youghal for shipment. An increased facility of intercourse in another direction, would, in all likelihood, turn this trade from Youghal. The trade in general merchandize is with Cork. Coal is the principal loading from Youghal.

Cork.

15. CORK.—The enumeration of travellers, carts, &c., to and from Cork, on the Dublin road, was at first taken near the entrance to the city; but as a correct enumeration could not be made there, without extraordinary difficulty, the enumerators were removed to Lower Glanmire.

Clogheen.

16. CLOGHEEN.—Nearly all the corn sold in Clogheen is carried to neighbouring mills, and Clonmel. Butter from the country around is carried to Clonmel by the farmers. With the exception of coal, which is brought from Youghal, all the heavy loading for the town is carried to it from Clonmel and Cork.

Cahir.

17. CAHIR.—More than half the heavy loading carried through Cahir, is on the line between Limerick and Clonmel: about one-fourth of the travelling is on the same line.

There is no market for butter in Cahir; this produce is carried by the farmers around the town to Clonmel.

Clonmel.

18. CLONMEL.—The enumerators in Clonmel at first registered only the trade and travelling on the Dublin line of road by Callan, omitting the lines by Cashel and Killynaule. The three lines are now comprised in the enumeration.

The heavy trade from Clonmel is on the River Suir. Flour for Dublin is thus conveyed for shipment at Waterford.

Appendix B.
No. 1.

Registry of Travelling and Traffic.

Killynaule.

19. Killynaule.—The corn sold in the market of Killynaule, is carried by jobbers to Clonmel. Large quantities pass through from Urlingford, &c.

Butter is not sold here. All the butter of this part of Tipperary is carried for sale to Mullinahone, between Clonmel and Kilkenny, where jobbers buy it for Carrick and Waterford.

Only two carts are employed between Killynaule and Dublin, taking up general loading, (frequently bacon from Fethard,) and returning with iron work and powder for the mines, also loading for the shops.

The coal of this district is bought at the pits by dealers, who for the most part sell in neighbouring towns to dealers, and these carry it farther to sell again. Fethard is the place of traffic on the road to Clonmel, &c. The carrying of this coal has rendered the cross roads of the district nearly impassable for any vehicles but the carriers' carts.

In Killynaule the coal is sold at *3d.* and *4d.* per cwt., the lower price being for the slack, which is prepared for use by being mixed with water and a little clay, and then made into balls. The large coal is fit for use when immersed for a short time in water. Its fire yields great heat, is cheaper than turf, very durable, and, when properly prepared, emits no offensive effluvia. The use of the coal is therefore increasing every year.

Kilkenny.

20. Kilkenny.—The corn, meal, and flour carried from Kilkenny, are conveyed to Bagnalstown, to be forwarded by the canal to Dublin, or are destined for Waterford.

The carts on the Waterford road are noted upon the registry, because a facility of transmission in another direction might change the course of the trade.

Carts with coal for the town, on the road to Dublin, by Castlecomer, are included in the enumeration.

Leighlinbridge.

21. Leighlinbridge.—The market of Leighlinbridge is almost confined to barley and butter, no other produce being sold in large quantities; and these are sent away in boats.

The carrying trade through the town is very trivial; the carts from Dublin to Kilkenny passing by Athy and Castlecomer.

Travellers on foot for Kilkenny, &c., generally pass through Bagnalstown instead of Leighlinbridge.

Carlow.

22. Carlow.—The corn sold in Carlow is all from the country within ten miles of the town; Athy market being on one side, and Milford, Leighlinbridge, and Bagnalstown on the other. Butter is brought to it from considerable distances. All the heavy carrying trade in corn, meal, flour, butter, &c., from the town, is in boats.

14th April, 1837. (Signed) W. STANLEY.

COPY OF INSTRUCTIONS ISSUED TO ENUMERATORS, BY THE COMMISSIONERS.

"You are to reckon all the loaded Carts which shall appear to be on journeys, and to enter the number as they shall pass to and from a Town, distant 10 miles from the place where you are stationed; but you are not to reckon those employed in drawing commodities to or from any place within 10 miles of the Town.

"You are not to enumerate Pigs, Sheep, or Lambs, entering the Town for a market or fair; or those taken away from it, unless ascertained to be destined for a Town distant more than 10 miles from where you are stationed.

"In the enumeration of Travellers you will observe the same rule; only reckoning those evidently on a journey.

(Signed) "HARRY D. JONES, Secretary."

FORM OF RETURNS FILLED UP BY THE ENUMERATORS.

ON WAY TO DUBLIN, OR TO A PLACE ON OR NEAR THE LINE OF ROAD.										
Date. 1837.	LOADED CARTS.			Pigs.	Sheep and Lambs.	PASSENGERS.				
	Carrying corn, meal, flour, or potatoes.	Carrying butter.	Carrying general loading.			In or upon Stage or Mail Coaches.	In or upon Caravans or Stage Cars.	In hired Post Carriages.	On hired Post Cars.	In private Vehicles upon Journeys.

ON WAY FROM DUBLIN, OR A PLACE ON OR NEAR THE LINE OF ROAD.										Passengers by Canal Boats, &c., to and fro.	Number of Travellers on foot, to and fro.
LOADED CARTS.			Pigs.	Sheep and Lambs.	PASSENGERS.						
Carrying corn, meal, flour, or potatoes.	Carrying butter.	Carrying general loading.			In or upon Stage or Mail Coaches.	In or upon Caravans or Stage Cars.	In hired Post Carriages.	On hired Post Cars.	In private Vehicles upon Journeys.		

Appendix B.
No. 2.

Tables of
Travelling
and Traffic.

APPENDIX B, No. 2.

TABLES OF TRAVELLING AND TRAFFIC COMPILED FROM RETURNS FURNISHED BY THE ENUMERATORS, IN THE MONTHS OF APRIL AND MAY, 1837.

1.—A STATEMENT of the TOTAL NUMBER OF PASSENGERS, LOADED CARTS, PIGS, SHEEP, AND LAMBS which passed in APRIL, 1837, (*during the Number of Days specified in the First Column of this Account,*) on the several LINES of COMMUNICATION between CORK, LIMERICK, and DUBLIN.

		No. of Days on which the Enumeration was made in April.	PASSENGERS.								Loaded Carts.	Pigs.	Sheep and Lambs.	Passengers on Foot.
			By Stage or Mail Coaches.	By Caravans or Stage Cars.	By Hired Post Carriages.	By Hired Post Cars.	By Private Vehicles on Journeys.	By Water.	Total.					
FIRST LINE. Road from Cork to Dublin, by Kilkenny.	1. Between Cork and Fermoy,	28	2,721	1,019	240	390	412	—	4,782		3,378	1,493	7	1,543
	2. — Fermoy and Mitchelstown, or Clogheen,	25	970	820	48	139	94	—	2,071		963	389	99	372
	3. — Clogheen and Clonmel,	29	321	5	36	48	51	—	461		530	72	—	532
	4. — Clonmel and Kilkenny,	28	628	1,443	68	115	24	—	2,278		2,931	5,154	—	675
	5. — Kilkenny and Leighlinbridge, or Athy,	30	2,336	1,873	486	948	976	—	6,619		2,334	4,586	239	1,299
	6. — Leighlinbridge and Carlow,	26	1,499	—	34	35	165	—	1,733		11	—	—	199
	7. — Carlow and *Kilcullen*,	28	2,611	445	67	370	162	—	3,655		277	316	231	261
SECOND LINE. Road from Cork to Dublin, by Cashel, including Mallow.	8. Between Cork and Mallow,	29	1,570	722	38	14	43	—	2,387		2,127	1,190	87	681
	9. — Mitchelstown and Cahir,	28	235	780	43	157	222	—	1,437		527	817	106	430
	10. — Cahir and Cashel,	29	244	824	40	153	163	—	1,424		903	1,349	—	116
	11. — Cashel and Towns towards Dublin, by Thurles, also by Urlingford,	20	217	556	173	309	446	—	1,701		1,185	4,749	838	623
	12. — Athy and *Kilcullen*,	28	791	723	—	20	38	—	1,572		305	1,261	—	156
Both Lines United,	13. Between Kilcullen and *Naas*,	25	2,939	1,477	38	92	258	—	4,804		688	882	154	1,580
THIRD LINE. Road from Limerick to Dublin; also the Grand Canal.	14. Between Mountrath and Maryborough, (with Passengers to and from the Canal Boats at Mountmellick,)	29	1,017	459	24	56	85	321	1,962		389	23	—	334
	15. Between Maryborough and Monasterevan,	29	1,224	839	42	72	238	—	2,415		898	242	145	549
	16. — Mountmellick and Monasterevan,	28	545	428	8	23	50	642	1,696		450	24	115	26
	17. — Monasterevan and *Naas*, (with Passengers by *Boats* between Monasterevan and Dublin,)	28	1,339	450	167	148	245	2,154	4,503		1,047	2,196	53	872
The Three Lines United	18. Between Naas and Dublin, (with Passengers by *Boats*, continued from 17,)	28	5,204	3,102	208	200	807	2,154	11,675		1,935	63	492	3,658
BRANCH LINES. Roads from Limerick to Clonmel, also between Clonmel and Maryborough.	19. Between Tipperary and Cashel, or Cahir,	28	321	1,052	79	315	257	—	2,024		682	2,487	134	484
	20. — Cahir and Clonmel,	19	120	313	4	50	15	—	502		477	2,025	—	65
	21. — Fethard (north of Clonmel,) and Killynaule,	28	—	288	—	30	79	—	397		1,614	20	—	208
	22. — Thurles and Towns on road to Clonmel; also Towns on road to *Maryborough*,	28	89	379	83	444	230	—	1,225		788	1,390	381	515

Appendix B. No. 2.

Tables of Travelling and Traffic.

2.—A STATEMENT of the AVERAGE NUMBER OF PASSENGERS, LOADED CARTS, PIGS, SHEEP, and LAMBS which passed DAILY, in APRIL, 1837, on the several Lines of Communication between CORK, LIMERICK, and DUBLIN; detailed in Statement No. 1.

N.B.—Fractions are omitted; but when the Average is close to a whole Number, the Amount is increased accordingly.

		Passengers by Roads, also by Water.	Loaded Carts.	Pigs.	Sheep and Lambs.	Passengers on Foot.
FIRST LINE. Road from Cork to Dublin, by Kilkenny.	1. Between Cork and Fermoy	171	121	53	—	55
	2. — Fermoy and Mitchelstown, or Clogheen,	83	38	15	4	15
	3. — Clogheen and Clonmel,	16	18	2	—	18
	4. — Clonmel and Kilkenny,	81	105	184	—	24
	5. — Kilkenny and Leighlinbridge, or Athy,	220	77	152	8	43
	6. — Leighlinbridge and Carlow,	66	—	—	—	8
	7. — Carlow and *Kilcullen*,	130	10	11	8	9
SECOND LINE. Road from Cork to Dublin, by Cashel, including Mallow.	8. Between Cork and Mallow,	82	73	41	3	23
	9. — Mitchelstown and Cahir,	51	19	29	4	15
	10. — Cahir and Cashel,	49	31	46	—	4
	11. — Cashel and Towns towards Dublin, by Thurles, also by Urlingford,	85	59	237	42	31
	12. — Athy and *Kilcullen*,	56	11	45	—	5
Both Lines United	13. Between Kilcullen and *Naas*,	192	27	35	6	63
THIRD LINE. Road from Limerick to Dublin; also the Grand Canal.	14. Between Mountrath and Maryborough (with Passengers to and from the Canal Boats at Mountmellick),	67	13	—	—	11
	15. — Maryborough and Monasterevan,	83	31	8	5	19
	16. — Mountmellick and Monasterevan,	60	16	—	4	1
	17. — Monasterevan and *Naas* (with Passengers, by *Boats*, between Monasterevan and Dublin),	160	37	78	1	31
The Three Lines United	18. Between Naas and Dublin (with Passengers by *Boats*, continued from 17),	417	69	2	17	130
BRANCH LINES. Roads from Limerick to Clonmel, also between Clonmel and Maryborough.	19. Between Tipperary and Cashel, or Cahir,	72	24	88	4	17
	20. — Cahir and Clonmel,	26	25	106	—	3
	21. — Fethard (north of Clonmel) and Killynaule,	14	57	—	—	7
	22. — Thurles, and Towns on the road to Clonmel; also towns on road to *Maryborough*,	44	28	50	13	18

Appendix B. No. 2.

Tables of Travelling and Traffic.

3.—Total Number of Passengers, Loaded Carts, Pigs, Sheep, and Lambs, enumerated in May, 1837,

—		Number of Days on which the Enumeration was made in May.	PASSENGERS.			
			By Stage or Mail Coaches.	By Caravans or Stage Cars.	By Hired Post Carriages.	By Hired Post Cars.
First Line. Road from Cork to Dublin, by Kilkenny.	1. Between Cork and Fermoy,	13	606	410	65	161
	2. — Fermoy and Mitchelstown, or Clogheen,	13	502	386	23	38
	3. — Clogheen and Clonmel,	13	133	–	16	21
	4. — Clonmel and Kilkenny,	13	348	445	18	49
	5. — Kilkenny and Leighlinbridge, or Athy,	20	1,345	1,435	322	752
	6. — Leighlinbridge and Carlow	20	1,082	–	35	120
	7. — Carlow and *Kilcullen*,	20	1,914	313	50	208
Second Line. Road from Cork to Dublin, by Cashel, including Mallow.	8. Between Cork and Mallow,	13	622	342	27	9
	9. — Mallow and Mitchelstown,	13	–	32	–	–
	10. — Mitchelstown and Cahir,	11	58	231	–	46
	11. — Cahir and Cashel,	13	88	114	–	23
	12. — Cashel and Towns towards Dublin, by Urlingford and Athy,	13	111	26	49	50
	13. — Athy and *Kilcullen*,	13	368	310	–	21
Both Lines United	14. Between Kilcullen and *Naas*,	13	1,587	791	6	46
Third Line. Road from Limerick to Dublin, also the Grand Canal.	15. Between Limerick and places towards Dublin, *east* of the Mountains,	13	415	–	2	6
	16. — Mountrath and Maryborough (with Passengers to and from the Canal at Mountmellick),	13	489	211	3	27
	17. — Maryborough and Monasterevan,	13	513	380	17	40
	18. — Mountmellick and Monasterevan,	13	174	182	6	2
	19. — Monasterevan and *Naas* (with Passengers, Pigs and Sheep, *by Boats*, between Monasterevan and Dublin),	13	657	227	78	110
The Three Lines United	20. Between Naas and Dublin (with Passengers, Pigs, and Sheep, *by Boats*, continued from No. 19),	13	2,761	1,395	29	50
The Sea and Shannon	21. Between Cork and Dublin, *by Sea*,	13	–	–	–	–
	22. — Limerick and Dublin, *by Shannon and Canal*,	13	–	–	–	–
Branch Lines. Roads between Limerick and Clonmel; also Clonmel and Maryborough; also Limerick and Mallow.	23. Between Limerick and Tipperary	13	165	597	5	6
	24. — Tipperary and Thurles,	13	–	6	–	–
	25. — Tipperary and Cashel, or Cahir,	13	132	460	80	211
	26. — Cahir and Clonmel,	13	78	257	–	21
	27. — Clonmel and Fethard,	13	–	169	–	52
	28. — Fethard and Killynaule,	28	–	254	–	6
	29. — Clonmel and Cashel,	13	–	275	2	78
	30. — Cashel and Thurles,	13	11	448	61	395
	31. — Thurles, Mountrath, and Maryborough,	13	47	144	20	110
	32. — Limerick and Mallow (Passengers only)	13	494	–	–	–

(*during the days in the First Column,*) on the Lines of communication between Cork, Limerick, and Dublin.

Appendix B. No. 2.

Tables of Travelling and Traffic.

PASSENGERS.			Loaded Carts.	Pigs.	Sheep and Lambs.	Passengers on Foot.	—
By Private Vehicles on Journeys.	By Water.	Total.					
72	–	1,314	1,260	142	–	532	Fermoy.—The principal carrying trade of Fermoy is with the Port of Youghal. The average number of loaded Carts passing to and fro, daily, in May, amounts to 28.
20	–	969	568	153	32	326	—
46	–	216	232	132	–	213	Clogheen has also a carrying trade with Youghal. The average number of loaded carts to and fro, daily, in May, is 5.
51	–	911	679	1,103	–	133	—
802	–	4,656	4,379	2,724	387	1,674	Kilkenny.—There is a considerable carrying trade between this place and Waterford. The average number of carts to and fro, daily, in May, is 30.
147	–	1,384	1,002	2,061	2,700	698	Leighlinbridge.—The average number of loaded boats on the Barrow River, between this town and Carlow, daily, is 1½; and between it and Bagnalstown, 1⅓.
157	–	2,642	227	616	640	212	Carlow.—The average number of loaded boats, daily, between this town and Athy, is 3; and between it and Leighlinbridge and Bagnalstown, also 3.
7	–	1,007	885	856	227	185	—
0	–	32	–	–	–	–	—
89	–	424	152	33	56	90	Mitchelstown is supplied with Coal from Youghal. One loaded cart, to and fro, is the daily average number passing between these towns.
32	–	257	159	153	134	34	—
82	–	318	58	–	17	158	—
15	–	714	144	102	63	100	Athy.—The average number of boats with loading, to, from, and through, daily, is 3.
111	–	2,541	419	354	138	673	—
62	–	485	129	21	–	–	—
40	129	899	203	106	48	115	Mountrath.—The greater number of the carts from and through Mountrath, discharge or receive loading at the canal in Mountmellick.
84	–	1,034	501	418	214	430	Maryborough.—The principal carrying trade to and from Maryborough, is with loading from or to the canal at Monasterevan. Carts of Coal from Timahoe, are discharged in Maryborough, averaging 4 daily.
24	415	803	142	208	90	–	—
95	844	2,011	387	843	250	314	Monasterevan.—The average number of loaded boats, to, from, and through this town, daily, in May, is 12.
355	844	5,434	688	233	440	1,925	Naas.—The average number of boats with loading, passing to and from Dublin, on the canal near this town, daily, in May, is 26.
–	91	91	–	–	–	–	—
–	287	287	–	–	–	–	—
162	–	935	505	540	34	1,027	—
–	–	6	–	–	–	–	—
111	–	994	634	1,307	100	258	—
72	–	428	452	1,138	37	141	—
21	–	242	529	92	57	106	—
96	–	356	1,537	262	55	54	—
5	–	360	558	1,812	41	125	—
135	–	1,050	404	2,557	267	392	Cashel and Thurles.—The carts with Coal for these towns, from the mines near Killynaule, are not included in this account. Those for Cashel average 14, and those for Thurles, 18, daily. The carts passing through, on the line of traffic comprised by the account, are included, averaging, daily, 11½ for Cashel, and 21 for Thurles.
84	–	405	482	1,040	121	165	—
–	–	494	–	–	–	–	—

Appendix B.
No. 2.
Tables of Travelling and Traffic.

4.—A STATEMENT of the DAILY AVERAGE NUMBER of PASSENGERS, LOADED CARTS, PIGS, SHEEP, and LAMBS on the several Lines of Communication between CORK, LIMERICK, and DUBLIN, in May, 1837; detailed in Statement No. 3.

N.B.—Fractions are omitted; but when the Average is close to a whole number, the Amount is increased accordingly.

	—	Passengers by Roads, and by Water.	Loaded Carts.	Pigs.	Sheep and Lambs.	Passengers on Foot.
FIRST LINE. Road from from Cork to Dublin, by Kilkenny.	1. Between Cork and Fermoy	101	97	11	–	41
	2. — Fermoy and Mitchelstown, or Clogheen	74	44	12	2	25
	3. — Clogheen and Clonmel	16	18	10	–	16
	4. — Clonmel and Kilkenny	70	52	45	–	10
	5. — Kilkenny and Leighlinbridge, or Athy	233	219	136	19	84
	6. — Leighlinbridge and Carlow	69	50	103	135	35
	7. — Carlow and *Kilcullen*	132	11	31	32	11
SECOND LINE. Road from Cork to Dublin, by Cashel, including Mallow.	8. Between Cork and Mallow	77	68	66	17	14
	9. — Mallow and Mitchelstown	2	–	–	–	–
	10. — Mitchelstown and Cahir	38	14	3	5	8
	11. — Cahir and Cashel	20	12	12	10	3
	12. — Cashel and Towns towards Dublin, by Urlingford and Athy	24	4	–	1	12
	13. — Athy and *Kilcullen*	55	11	8	5	7
Both Lines United	14. Between Kilcullen and *Naas*	195	32	27	11	52
THIRD LINE. Road from Limerick to Dublin; also the Grand Canal.	15. Between Limerick and Towns towards Dublin, *east* of the mountains	37	10	1	–	–
	16. — Mountrath and Maryborough (with Passengers to and from Mountrath and the Canal at Mountmellick)	69	15	8	4	9
	17. — Maryborough and Monasterevan	79	38	32	16	33
	18. — Mountmellick and Monasterevan	62	11	16	7	–
	19. — Monasterevan and *Naas* (with Passengers, Pigs, and Sheep *by Boats*, between Monasterevan and Dublin)	155	30	65	19	24
The Three Lines United	20. Between Naas and Dublin (with Passengers, Pigs, and Sheep *by Boats*, continued from 19)	418	53	18	34	147
The Sea and Shannon	21. Between Cork and Dublin, *by Sea*	7	–	–	–	–
	22. — Limerick and Dublin, *by Shannon and Canal*	22	–	–	–	–
BRANCH LINES. Roads between Limerick and Clonmel; also Clonmel and Maryborough; also Limerick and Mallow.	23. Between Limerick and Tipperary	72	39	41	2	80
	24. — Tipperary, and Cashel or Cahir	76	49	100	7	20
	25. — Cahir and Clonmel	33	35	87	3	11
	26. — Clonmel and Fethard	19	41	7	4	8
	27. — Fethard and Killynaule	13	55	9	2	2
	28. — Clonmel and Cashel	28	43	139	3	9
	29. — Cashel and Thurles	81	31	197	20	30
	30. — Thurles, Mountrath, and Maryborough	31	37	80	9	13
	31. — Limerick and Mallow	38	–	–	–	–

5.—AN ESTIMATE of the Daily Receipt for Passengers, Merchandize, Pigs, and Sheep on a Railway between Cork, Limerick, and Dublin, by Maryborough, with a Branch between Maryborough and Kilkenny; assuming that only as many Passengers, as much Merchandize, and as many Pigs and Sheep, would be conveyed on the Line as are averaged in the preceding Table, No. 4.

—	—	Distance in statute miles by the present Roads.	PASSENGERS.			MERCHANDIZE.			PIGS.*			SHEEP.†		
			Number Daily in May, 1837.	Equivalent Number of Passengers per Mile per Day.	Receipt at 1¼d. per Mile for each Passenger.	Loaded Carts daily in May, 1837.	Weight of Loading at 15 cwt for each Cart.	Receipt at 2d. per Ton per Mile.	Number Daily in May, 1837.	Weight at 1 cwt. for each Pig.	Receipt at 5d. per Ton per Mile.	Number Daily in May, 1837.	Weight at an average of 1 cwt. for each Sheep.	Receipt at 5d. per Ton per Mile.
					£ s. d.		Tons. Cwts.	£ s. d.		Tons. Cwts.	£ s. d.		Tons. Cwts.	£ s. d.
Available portion of Passengers, &c., on present line between Cork and Dublin by Kilkenny.	1. Between Cork and Fermoy,	23	101	2,323	12 1 11¼	97	72 15	13 18 10½	11	0 11	0 5 3¼	–	–	–
	2. — Fermoy and Mitchelstown, or Clogheen,	14	74	1,036	5 7 11	44	33 0	3 17 0	12	0 12	0 3 6	2	0 2	0 0 7
	3. — Clogheen and Clonmel,	14	16	224	1 3 4	18	13 10	1 11 6	10	0 10	0 2 11	–	–	–
	4 — Clonmel and Dublin; assuming that all the Passengers between Clonmel and Kilkenny, *by Coach and Post Carriages*, are travelling to or from Dublin; and that one-fourth of the carts passing through Athy and Leighlinbridge are in progress to or from Clonmel,	104	31	3,224	16 15 10	3	2 5	1 19 0	–	–	–	–	–	–
	5 Between Kilkenny and Dublin; assuming that the Passengers *through* Leighlinbridge and Athy, are proceeding to or from Kilkenny, except the number for Clonmel at 4, and for Cashel at 9; and also, assuming that one-half of the carts passing through these towns are to or from Kilkenny	72	65	4,680	24 7 6	6	4 10	2 14 0	–	–	–	–	–	–
Available portion of Passengers, &c., on present line between Cork and Dublin, by Cashel, including Mallow.	6. Between Cork and Mallow,	22	77	1,694	8 16 5½	68	51 0	9 7 0	66	3 6	1 10 3	17	0 17	0 7 9½
	7. — Mitchelstown and Cahir,	16	38	608	3 3 4	14	10 10	1 8 0	3	0 3	0 1 0	5	0 5	0 1 8
	8. — Cahir and Cashel,	11	20	220	1 2 11	12	9 0	0 16 6	12	12 0	0 2 9	10	0 10	0 2 3½
	9 — Cashel and Dublin; assuming that all Passengers to and from Cashel on the Dublin road, are from Dublin or proceeding to it,	96	24	2,304	12 0 0	–	– –	–	–	–	–	–	–	–
Available portion of Passengers, &c., on present road between Limerick and Dublin—also, by Grand Canal.	10. Between Limerick and *Maryborough*, being the passengers and carts enumerated at Limerick, as proceeding to or arriving from places on the Dublin road, *east* of the mountains,	68	37	2,516	13 2 1	10	7 10	4 5 0	–	–	–	–	–	–
	11. Between Maryborough and Monasterevan, adding the passengers conveyed between Mountrath and the Canal Boat Station in Mountmellick, assuming that they would prefer travelling by a Railway from *Maryborough*,	12	89	1.068	5 11 3	33	28 10	2 17 0	32	1 12	0 8 0	16	0 16	0 4 0
	12. Between Monasterevan and Naas, (including Passengers, Pigs, and Sheep, now conveyed *by Boats*, between Monasterevan and Dublin,)	18	155	2,790	14 10 7½	30	22 10	3 7 6	65	3 5	1 4 4½	19	0 19	0 7 1½
	13. Between Naas and Dublin—continuing the Canal Passengers, &c., in preceding item; but deducting from the average for Naas, the numbers already included at 4, 5, and 9, for Clonmel, Kilkenny, and Cashel,	19	298	5,662	29 9 9½	44	33 0	5 4 6	18	0 18	0 7 1½	34	1 14	0 13 5½
Passengers by Sea, and by boats on the Shannon.	14. Between Cork and Dublin (passengers *by Sea*),	155	7	1,085	5 13 0¼	–	– –	–	–	–	–	–	–	–
	15 — Limerick and Dublin (passengers by Boats, on Shannon and Canal),	119	22	2,618	13 12 8½	–	– –	–	–	–	–	–	–	–
Available portion of passengers &c., on Road between Limerick and Clonmel; Clonmel and Maryboro'; also Limerick and Mallow.	16. — Limerick and Tipperary,	26	72	1,872	9 15 0	39	29 5	8 6 9	41	2 1	1 2 2½	2	0 2	0 1 1
	17. — Tipperary and Cahir,	12	76	912	4 15 0	49	36 15	3 12 6	100	5 0	1 5 0	7	0 7	0 1 9
	18. — Cahir and Clonmel,	10	33	330	1 14 4½	35	26 5	2 3 9	87	4 7	0 18 1½	3	0 3	0 0 7½
	19. — Clonmel and Fethard,	8	19	152	0 15 10	41	30 15	2 1 0	7	0 7	0 1 2	4	0 4	0 0 8
	20 — Fethard and Killynaule,	7	13	91	0 9 5¾	55	41 5	2 8 1½	9	0 9	0 1 3¾	2	0 2	0 0 2¼
	21. — Clonmel and Cashel,	18	28	504	2 12 6	43	32 5	4 16 9	139	6 19	2 12 1½	3	0 3	0 1 1½
	22. — Cashel and Thurles,	12	81	972	5 1 3	31	23 5	2 6 6	197	9 17	2 9 3	20	1 0	0 5 0
	23. — Thurles and *Maryborough*,	38	31	1,178	6 2 8½	37	27 15	9 15 9	80	4 0	3 3 4	9	0 9	0 7 1½
	24 — Limerick and Mallow.—(See Observations, App. B, page 2.)	43	38	1,634	8 10 2½	–	– –	–	–	–	–	–	–	–
	Total daily,		1,445	39,697	206 15 1¼			86 17 0			15 17 8½			2 14 6
						General Total,			£312 4s. 3¾d.					

* The charge for the conveyance of Pigs, on the Liverpool and Manchester Railway, is at the rate of 25s. per waggon.—The weight of the Pigs varies from half a cwt. to two cwts. each; and the usual weight carried in a waggon may be taken at 45 to 50 cwts.

† The charge for the conveyance of Sheep is 30s. per double floored caravan: they are neither weighed nor counted—but the charge may be estimated at from fourpence to sixpence each. Young Lambs, in the season, are frequently sent by the coach trains—in which case the charge is one shilling each.—(*Extract of Letter from H. Booth, Esq.*)

Appendix B.
No. 3.
Summary of Results of Inquiry into the Carrying Trade of Towns north of Dublin.

APPENDIX B. No. 3.

SUMMARY OF RESULTS OBTAINED BY LOCAL INQUIRY INTO THE CARRYING TRADE TO AND FROM CERTAIN TOWNS NORTH OF DUBLIN,

In January and February, 1837.

Towns.	Carrying of Agricultural Produce.	Merchandize.	Manufactures.	Passengers.
BALBRIGGAN, County of Dublin. 19 statute miles north of the Metropolis. Population in 1831—3,016. (Report, in detail, page 14.)	Only two merchants buy Corn in Balbriggan market, to resell or export, and the Corn bought by them is usually shipped to England in the harbour of the town. Millers make large purchases in the market, and also at their mills in the neighbourhood.—(*See Abstract of Millers' Returns.*) The largest portion of the produce of the district is sent by the farmers to the markets of Dublin and Drogheda, of this no account can be obtained.	Coals and Salt are imported. Timber, Iron, and Slates, when required for use, are purchased in Drogheda, or Dublin, or imported. The sales, in a year, of Sugar, Tea, Whiskey, and Tobacco, are estimated to amount to 83½ tons, carried from Dublin principally. Cotton Wool, for spinning in the town, is principally carried from Drogheda.	Salt boiling, Cotton spinning and Weaving, Stocking weaving, and the embroidering of Muslin, are carried on in the town and neighbourhood, but do not create much trade in carrying.	The travelling to Dublin is increasing. There is a long Car for the town, plying daily to and fro. Two long Cars pass through daily, and two Coaches also to and fro. A third Coach passes through on alternate days.
DROGHEDA, Counties of Meath and Louth. 10 statute miles north of Balbriggan. Population in 1831—17,365. (Report, in detail, page 15.)	The great bulk of the Corn sold in the town by market dealers, and therefore carried to it in large quantities at a time, is received on one line of communication, from Navan and Oldcastle, in Meath, and towns in Cavan, and on another line, from Ardee, in Louth, which supplies about 62 tons, weekly, during the season. All the Corn not bought by millers, distillers, and brewers, is exported to England and Scotland, except about 250 tons sent in the year, coastwise, to the north of Ireland and Dublin. Butter sold in the town is for local consumption. When any is required for export it is obtained from Cavan. Flax is collected for the spinning mills of the town, in the counties of Cavan, Monaghan, and Armagh. The Cattle and Sheep exported, are from Meath and Louth. The great supply of Pigs arrives by the Kells road (leading towards Navan, Oldcastle, &c.), from places west or north-west of that town.	All the Merchandize sold or used in the town is imported, except a portion of the Sugar, Tea, Tobacco, Apparel, Hardware, Whiskey, Wine, and some minor articles obtained from Dublin. The trade with Dublin is decreasing, and that with Liverpool extending. There is a great carrying trade from the town westward, in Timber (chiefly plank), Iron, Coal, Salt, Slates, cured Fish, &c. The quantities carried in each direction cannot be estimated.	Linen Yarn Mills have been erected in the town for the supply of the weavers in it, and the general trade; but only one of these establishments is yet at work. Supplies of Yarn are imported from England and Scotland, and obtained from Belfast by sea, there are also supplies carried from Navan, and hand-spun Yarn is obtained from Longford and Roscommon. Some of the Yarn made in the town is sent to the districts from which the Flax is procured. The Linen trade of the town has declined. It was carried on, in its greatest extent, from 1814 to 1820. About 400 pieces of Sheetings, &c., are now bought weekly for Dublin, and carried away by land: these weigh nine tons. The cotton trade was actively carried on from 1820 to 1826. It is now very limited. A large quantity of Whiskey, made in the town, is sent to Navan, and other towns westward. Beer is sent away in large supplies to Dublin and the north of Ireland. Malt is also sent to Dublin. Salt, Leather, Glue, Tobacco, and Soap, made in the town, form a considerable part of the loading for the westward towns.	There is now only one Stage Coach plying between Drogheda and Dublin, which is for 15 passengers, and runs to and fro daily. Two long Cars, each for 16 passengers, are also employed daily on the Dublin roads. Several Coaches and a long Car pass through. The intercourse with Dublin is not increasing.
NAVAN, County of Meath. 30 statute miles north-west of Dublin. Population in 1831—4,416. (Report, in detail, page 17.)	Corn is bought for Navan, by dealers at various markets in Meath, Cavan, Westmeath, King's County, and Kildare. A great portion of the quantity brought to the town is used in the local mills, distillery, &c. 5,270 tons of Corn (it is estimated) are bought in the town in the season, and sent on towards Drogheda. Of this quantity a large portion is carried on the carts of dealers, who resell in Drogheda, or at mills on the way; and a considerable part is conveyed in boats. It is estimated that there is carried, annually, to Dublin—891 tons of Corn, 1,920 tons of Potatoes; 52 tons of Butter; also 9,360 Pigs, and 27,300 Sheep and Lambs, which, at an average of one cwt. each, would weigh 1,833 tons.	200 tons of Timber from Dublin and Drogheda. 200 tons of Iron, nearly all from Drogheda. Slates, as required for use, from Drogheda. 50 tons of Salt, and 3,500 tons of Coal, from Drogheda. 102 tons of Sugar, principally from Dublin. 12 tons of Tea. One-half from Dublin; one-sixth through Dublin, from London; and one-third through Drogheda, from Liverpool. 16 cwt. of Coffee, from Dublin. 166 tons of Whiskey and Wine. Sixty tons of the Whiskey are made in Navan; the remainder is from Dublin and Drogheda. 10 tons of Tobacco, 80 tons of Tallow; 40 tons of Ashes, 45 tons of Soap; 10 tons of Starch, 25 tons of Bark; 2 tons of Oil.	150 tons of Linen Yarn are obtained from Dublin and Drogheda. 97 tons of Linen Yarn are sent to Drogheda, from a manufactory at Navan. 160 tons of Sackcloth, are sent to Dublin, Drogheda, Dundalk, and Newry; the greater part to Dublin. 52 tons of Paper, Rags, old Iron, &c., are sent to Dublin. The Manufactures of the town thus give in a year to the carrying trade a total of 459 tons. Combining Agricultural Produce, Merchandise, and Manufactures, the annual total is 15.101 tons, exclusive of Flour, Bran, and Meal (*for which see the Abstract of Millers' Returns*); also of Farm Seeds, Slates, Lead, and other commodities carried for use (not sale), as required either in the town or neighbourhood.	Three day Coaches and a night Mail, also a long Car, pass through Navan, to and from Dublin. A Car plies daily between the town and Drogheda. There is a day Coach between the town and Dublin.

Appendix B.

No. 3.
Summary of Results of Inquiry into the Carrying Trade of Towns north of Dublin.

	The Flax for local use, obtained from the counties of Cavan, Managhan, and Armagh, annually, weighs 234 tons The total weight of the Agricultural Produce carried away, and of Flax received, is therefore 10,200 tons.	The weight of the Hardware, Apparel, Glass, and some minor articles, cannot be ascertained. Total of estimated weight, 4,442 tons. The general trade with Dublin is said to employ not more than 15 Carts, twice a-week, to and fro. The charge of carriage between the town and Dublin is 16*s.* 8*d.* per ton, but occasionally it is only 15*s.* The general charge for carrying between the town and Drogheda is 6*s.* 8*d.* per ton, and the distance is half as much as to Dublin. This shows that the greater part of the trade is with Drogheda; however, the charge by Boat to that town is only 4*s.* per ton, which necessarily keeps down the charge for land carriage, and of this sum 2*s.* 3*d.* is toll. There are eight Navan Boats employed, and Drogheda Boats occasionally.	About 50 Carts are employed permanently by the carrying trade of the town and neighbourhood, and upwards of 100 are employed in the active period of the Corn and Potato trade.	
TRIM, County of Meath. 10½ statute miles south-west from Navan. Population in 1831—3,282.	The Corn carried away from Trim in a raw state, is bought by dealers, nearly all of whom reside in other places, and therefore the quantity cannot be accurately estimated, but the greater part is resold in Navan.	The trade of this town is principally with Dublin and Navan, and is very limited, but the carrying on the line is considerable. Twenty-two carts, each carrying about a ton, leave Trim daily, on the road between Dublin, Trim, Athboy, Castlepollard, Granard. Oldcastle, and Killysandra.	There is a very limited Linen trade, but no other manufacturing in the town or neighbourhood, (Flour, &c. excluded,) except Tanning and Brewing.	A Coach between Dublin and Killysandra passes through daily. A Coach between Dublin and Granard passes on alternate days. A Caravan between Dublin and Athboy passes daily.
ATHBOY, County of Meath. 7½ statute miles north-west of Trim. Population in 1831—1959.	There is not a Corn market in Athboy, but numerous dealers reside in it, who collect Corn in several places to resell in Navan.	The town is supplied with Merchandize from Drogheda and Dublin, the principal trader employing his own carts to convey his supplies.	There are a few Linen Weavers, but no other manufacturing is carried on, exclusive of Flour, &c. There is an extensive mill.	The Coaches which pass through Trim also pass through Athboy, and the Caravan passing through Trim stops here.
KELLS, County of Meath. 10½ statute miles north-west of Navan. Population in 1831—4,326.	The market of Kells being in a pasture district, depends for supplies on the produce of farms on the northern border of the county, and the adjoining border of Cavan. The market is very limited and there is not any person in extensive trade in the town who buys produce in the market to resell or export. Market dealers buy in it, to resell in Navan or Drogheda.	The general trade of the town is inconsiderable. Coal is only partially used in it, although generally retailed in Navan at £1 per ton. The carrying of merchandize to the numerous establishments of land-owners, &c. in the neighbourhood, must give employment to many persons. Carts loaded with Irish produce are continually passing through the town; the greater number taking the direction of Drogheda. A portion returns loaded with general merchandize, but many are empty.	There are a few Linen Weavers, but no other manufacturing is carried on except brewing, and the embroidering of Lace for an establishment in England	A Coach for 14 passengers plies daily between Kells and Dublin; also a long Car for the same number of persons; and three Coaches pass through daily, to and fro.
OLDCASTLE, County of Meath. 11½ statute miles north-west of Kells. Population in 1831—1531	A great number of dealers purchase agricultural produce in Oldcastle, for other markets. The principal sales of Corn are made to millers. [*See Abstract of Millers' Returns.*]	The trade of the town is with Drogheda and Dublin.	There are a few Linen Weavers, but no other manufacturing, exclusive of Flour, &c.	A Coach passes through, daily, between Dublin and Killysandra, county Cavan.
DUNDALK, County of Louth. 21 statute miles north of Drogheda. Population in 1831—10,078. (Report in detail, page 21.)	The Wheat and Barley carried to Dundalk, are the produce of Louth and Monaghan. The supplies of Oats are from these counties, and from Cavan and Fermanagh. The supply of Louth Oats is only sufficient for the local consumption; and as the exports of Oats and Oatmeal in 1835, (the latest year for which the Dundalk export accounts were made up,) amounted to 17,940 tons more than the local sale of Oats, this quantity, at least, must have been carried from Monaghan, Cavan, and Fermanagh counties. The Butter exported from Dundalk is from the northern part of Longford, and from Cavan and Monaghan counties, amounting to about 550 tons in the season, sent coopered, ready for shipping. The Cattle and Sheep exported, are from Louth and Meath. The Pigs are from Louth, Meath, Longford, Leitrim, Cavan, Monaghan, and Armagh counties. The Flax exported is from the markets of Monaghan and Cavan counties.	Coals, Timber, Iron, Slates, and Salt are carried from Dundalk to towns in Monaghan and Cavan, and traders in these counties import through Dundalk merchandize bought by them in Liverpool, Manchester, Birmingham, Leeds, &c. Merchandize is still carried to the town, from Dublin, Newry, and Belfast; but it is expected that the local trade, (exclusive of that in Irish manufactures,) will soon be wholly supplied with imports.	The only manufactures carried to Dundalk by land, in considerable quantities, are Linens for exportation, from the neighbourhood of Ballybay, county of Monaghan. The Irish manufactured articles carried from the town in heavy loads, are Salt, Flour, and Whiskey; and these are taken in largest quantities westward.	Three Belfast Coaches, and an Armagh Coach, pass through daily. A Newry Car also passes through daily. A Newry Coach passes to and fro, on alternate days. There are two Cars plying between the town and Newry. The intercourse with Dublin is very limited, and has decreased.

Appendix B.

No. 3.
Summary of Results of Inquiry into the Carrying Trade of Towns north of Dublin.

SUMMARY of RESULTS obtained by Local Inquiry into the CARRYING TRADE to and from certain TOWNS NORTH OF DUBLIN—*continued*.

TOWNS.	CARRYING OF AGRICULTURAL PRODUCE.	MERCHANDIZE.	MANUFACTURES.	PASSENGERS.
CAVAN, 51 statute miles west of Dundalk. Population in 1831—2,931. (Report in detail, page 22.)	The local supply of Wheat and Barley is very small and insufficient. Of 7,500 tons of Oats, the average quantity sold in a year, only a small part is carried away for resale or export; the purchases for millers and a local distillery being very great. About 200 tons of Butter are carried away, principally to Dundalk and Newry, and some to Drogheda. The number of Pigs sold to dealers is not known in the town. The quantity of Flax carried away is also unknown. The annual sale of Wool exceeds 14 tons; and part of this, (from six to eight tons) is sent to Dublin, with 4 tons of Fermanagh Wool.	It is estimated by local traders, that the following quantities of merchandize are carried to Cavan, in a year, for sale:— 80 tons of Flour from Slane, county Meath, Drogheda, and Dundalk; 70 tons of Coal from Dundalk, exclusive of large supplies obtained from that port, directly, for private families, and the establishments of traders; 47½ tons of Sugar, raw and refined, from Dublin; 4 tons of Wine, also from Dublin; 3 tons of Tea and Coffee from Dublin; 50 tons of Whiskey, the greater part from Belturbet and Carrickmacross; 50 tons of Salt from Dundalk and Drogheda; 165 tons of unmanufactured Tobacco, through Dublin, (at present) from London; 20 tons of Soap from Clones and Dublin; 5 tons of Starch from Dublin; 6 tons of Leather from Dublin and Drogheda; 220 tons of Timber from Dundalk and Ballyshannon; 74 tons of Iron, Tin, and Hardware, from Dundalk, Newry, and Drogheda; 3½ tons of Lead from Dublin and Drogheda.—Total, 748 tons, exclusive of farm Seeds, Apparel, &c., the weight of which is unknown.	There is no manufacturing in Cavan, except Tanning, which is very limited, and Tobacco spinning. The charge for carrying merchandize from Dublin, is 2*s*. 4*d*. per cwt., and from Newry and Dundalk 1*s*. per cwt., and occasionally only 8*d*. or 9*d*. per cwt.	A day Coach for 15 passengers plies between Cavan and Dublin. Two Enniskillen Coaches pass through daily.
NEWRY, Counties of Down and Armagh. 13 statute miles north of Dundalk. Population in 1831—13,065. (Report in detail, page 24.)	The Wheat, Oats, and Barley carried to Newry, are principally the produce of the counties of Down and Armagh. The largest supplies of Cattle and Pigs are from Armagh, Tyrone, and Monaghan counties. Butter is carried to the town from all the markets westward of it, as far as Enniskillen, and some of these obtain supplies from the county Leitrim. The heavy supplies are from the counties of Down, Armagh, Tyrone, and Monaghan. The exports of Butter from Newry, in the five years preceding 1825, give an annual average of 2684 tons; they have since increased, and are estimated to exceed 3335 tons, annually. The Flax exported is principally from the market of Armagh, and that of Tanderagee, in the same county.	The carrying trade from the town to places westward of it, is very extensive, and would be largely increased if there were a good road to Monaghan, Castleblayney, &c. The merchandize used in the town, as well as that carried away, is nearly all imported. Small parcels of merchandize are obtained from Belfast and Dublin.	There are Linen Yarn and Cotton Mills near Newry; and the Linen trade is carried on extensively; but the general carrying trade is not much affected by these branches of manufacturing in this district. Sackcloth is carried to the town from Navan, county of Meath. The Leather made in the town is not sufficient for the sale in it. A large quantity of under Leather is obtained from Dublin. There are two Salt manufactories in the town; but about half the quantity of Salt required is imported. All the produce of the distillery and brewery of the town goes into local consumption. Tobacco and Soap made in the town enter largely into the carrying trade from it.	The following Coaches and Cars ply from Newry or pass through, and indicate the principal lines of traffic from the town: To Dublin, a Coach on alternate days (except Sundays) carrying ten passengers, also a long Car daily. To Dundalk, two Cars ply daily, to and fro. To Dublin and Belfast, three Coaches pass through daily. To Banbridge, a Car daily. To Downpatrick, a mail Car at night. To Armagh, a Car daily. To Dublin and Armagh, a Coach daily. To Dungannon, in Tyrone, a Coach daily. To Monaghan, Castleblayney, and Ballybay, a Car daily.
BELFAST, Counties of Antrim and Down. 38 statute miles north of Newry. 102 statute miles north of Dublin. Population in 1831—53,287. (Report in detail, page 25.)	The Corn carried to Belfast is from districts within thirty miles of it. The great bulk of the supply is brought in by farmers, in small loads under a ton. The portion obtained from market dealers is principally purchased in Randalstown, north of Lough Neagh. Large supplies are received by sea, from the coast of Antrim and Down. The prices of Wheat in Belfast are usually so high that Wheat and Flour can frequently be imported from London, and sold at a profit. Butter is obtained from the northern districts of Down and Armagh, and the southern districts of Antrim and Tyrone. The exportation of Butter is not increasing at Belfast, in consequence of the rivalry of Newry, Portrush, on the north coast of Antrim, and Londonderry. If the present exportation from Belfast be equal to an annual average of the exports in 5 years preceding 1825, it does not exceed 1878 tons.	Belfast being the commercial capital for a large part of Ulster, the carrying of merchandize from it necessarily creates a very large and active trade for carriers, but its extent can only be known at the towns which sustain it. The Lagan Navigation to Lough Neagh participates largely in the trade occasioned by the carrying of Coal, Timber, and other bulky commodities.	There are in Belfast and its suburbs fifteen steam power mills, for the spinning of Linen Yarn; and there are four yarn mills at neighbouring towns. In addition to the Yarn obtained from these mills, the town distributes large supplies of hand spun Yarn, received from the counties of Longford and Roscommon, (through Dublin by sea) and from the counties of Armagh, Monaghan, and Tyrone, by land. The hand spun Yarn sold on commission in the hall of Belfast, produces about £100,000 a year. One of the steam power mills in the town spins 720 tons of Flax annually, the Yarn of which is worth £80,000. Linen is sent to Belfast on commission from all parts of Ulster; also from Leitrim, Sligo, Mayo Roscommon, Longford, and King's County. A table in the Report shows the localities of the Linen trade throughout Ireland. The largest supply obtained from one locality is purchased in Ballymena, by Belfast merchants. The old market trade has increased considerably in that town. Various kinds of manufacturing are carried on extensively in Belfast and near it; but it would be impossible to estimate the quantum of employment which is thus created for the carriers on the principal lines of communication with the interior.	A Steam vessel and 3 daily Coaches are employed between Belfast and Dublin. [For the travelling to towns in Ulster, see Abstract of Returns made by the Constabulary.]

Appendix B.
No. 3.
Summary of Results of Inquiry into the Carrying Trade of Towns north of Dublin.

	Pork, in very large quantities, is carried to the Belfast curing establishments by farmers (whose supplies are best) and by dealers (whose supplies are largest); and the principal part is brought on the line south of Lough Neagh. Flax, in largest quantity, is received by the same line of communication.	The local supply of Leather is insufficient; as is also the local supply of Whiskey. The manufacture of Salt has been neglected since the repeal of the import duties; although extensively carried on in towns nearer to the English establishments.		
ENNISKILLEN, County of Fermanagh. 102 statute miles north-west of Dublin. 70 statute miles west of Newry. 92 statute miles west of Belfast. Population in 1831—6,116. (Report in detail, page 28.)	Very little Corn is bought in Enniskillen, to be resold or exported, even in abundant seasons. Wheat bought for either purpose is usually sent to Londonderry. The greater part of the Oats for export is sent to Ballyshannon. About 450 tons of Butter are sent to Londonderry and Newry. Six years ago, all bought was sent to the latter town; now, the greater part is sent to Londonderry. It is estimated that 9,000 Pigs, Sheep, and Lambs are taken away annually for the same ports. The surplus of Flax is sent to Belfast, but does not exceed 14 tons in the year. The Fermanagh Wool is not sent to Enniskillen market. A trader in Cavan sends about 4 tons of it annually to Dublin.	The annual consumption of Flour by bakers in the town, is 438 tons. Supplies are received from various quarters to which the carriers have business, for the general trade. The absence of some of the principal traders, when the enquiry as to the local trade was made, precluded the obtaining of an estimate of its extent. Timber is imported through Ballyshannon, with the greater part of the Iron and Metal. Large supplies of Iron and Metal are received through Newry. Coals and Salt are received from Ballyshannon and Sligo. Merchandize is carried between Enniskillen and Londonderry, 57 statute miles, at from 1*s.* to 2*s.* per cwt.; between it and Newry, 70 statute miles, for 1*s.* 6*d.* to 2*s.* 6*d.* per cwt. (according to the season); and between it and Belfast, 92 statute miles, and Dublin, 102 statute miles, for 3*s.* to 3*s.* 6*d.* per cwt.	The only local manufactures which occasion a carrying trade are Linens. About 6,500 pieces are sent annually, when bleached, for exportation to Londonderry and Belfast.	There are two Coaches plying daily between Enniskillen and Dublin. There is a Coach to Ballyshannon, which carries Passengers gratuitously to and from the Enniskillen mail Coach to Dublin. There is also a Coach to Londonderry. Another plies between the town and Belfast, Only £1 5*s.* is now charged for an inside seat from Ballyshannon to Enniskillen, and thence to Dublin; in all, 130 statute miles
CLONES, County of Monaghan. 86¼ statute miles north of Dublin. 35 west of Dundalk. 48 west of Newry. Population in 1831—2,381. (Report in detail, page 30.)	3950 tons of Corn were carried from Clones annually, on an average of 1833, 1834, and 1835, to Dundalk and Newry. Also 130 tons of Flax to Armagh. Belfast, Newry, and Dundalk. 146 tons of Butter and Eggs to Dundalk, Newry, and Belfast. 34,100 Pigs, Sheep, and Lambs, which, at one cwt. each, would weigh 1705 tons. Total, 5,931 tons.	The supplies of Timber, Iron, Slates, Salt, and Coals are from Dundalk and Newry. Sugar and Tea are from Belfast. Ashes are also from Belfast. Tallow is from Newry and Belfast. The quantity of Salt carried to the town cannot be estimated, the trade being principally in the hands of travelling dealers. The whole quantity of merchandize carried to the town in a year, for sale, (exclusive of Salt, Seeds, and Slates,) the weight of which can be ascertained, is estimated to exceed 456 tons The charge for carrying between the town and Dundalk, is 10*d.* per cwt.; between it and Belfast, 2*s.* 4*d.* per cwt.; between it and Dublin, 3*s.* per cwt. Eleven carts are employed weekly, between Clones and Dublin; eight between it and Belfast; one hundred and thirty between it and Dundalk and Newry. If the carts to Dublin and Belfast carried each a ton in every week, and those to Newry and Dundalk, one ton and a half weekly, through the year, the whole quantity carried, including Flour and Meal from the mills, would be 11,128 tons.	5,000 pieces of Linen are sold annually in Clones market, and sent to bleaching establishments in the counties of Armagh and Down.	There is only 1 Coach between Dublin and Clones, which plies on alternate days; and is also for Cootehill and King's Court, county Cavan, through which it passes.
MONAGHAN, County of Monaghan. Population in 1831—3,848.	Under the circumstances stated in the Report, an inquiry into the trade of Monaghan was not carried to completion. The direction of the trade is strongly indicated by the following charges of carrying to and from the town — To Dundalk, or from it, 29¼ statute miles, 0*s.* 6*d.* per cwt. To Belfast, or from it, 57 statute miles, 1*s.* 6*d.* per cwt. „ Newry, „ 33 „ 1*s.* 0*d.* do. „ Dublin, „ 80 „ 3*s.* 0*d.* do.			There is not a Coach from the town to Dublin; but the Londonderry Coach passes through, and a day Coach from Omagh passes to and fro on alternate days. A second Coach from Omagh, by Ballybay, has been recently withdrawn.

APPENDIX B, No. 4.

INQUIRY

MADE BY DIRECTION OF THE RAILWAY COMMISSIONERS

INTO THE

CARRYING TRADE OF THE TOWNS NORTH OF DUBLIN;

BY WILLIAM STANLEY, Esq.

BALBRIGGAN.

Appendix B.

No. 4.

Inquiry into the Carrying Trade of the Towns north of Dublin.

BALBRIGGAN.

Agricultural Produce.

Wheat, Oats, Barley, Potatoes, Hay, &c.

BALBRIGGAN is the market town for only a portion of the agricultural produce of that rich tillage district in which it stands. A great part is sent directly from the farms to Dublin and Drogheda; and wheat and oats, in considerable quantities, are sold at the stores of four extensive mills in the vicinity, from which supplies of flour, meal, and bran are sent to the towns of the district and to Drogheda. Therefore, an account of sales, in the market, however correct, with an estimate of the proportion destined for removal to other places, would not indicate any thing near the extent of the carrying trade sustained by the agricultural produce of this part of the county of Dublin.

Only two corn merchants (exclusive of local millers) attend the market—one from Dublin, and the other from Drogheda; and until the present season (commencing after the harvest of 1836), the purchases of both were made on orders from Liverpool and Preston. The produce of 1836, however, has not been shipped for England, to any considerable amount, the prices of the Balbriggan market being so high as to check this trade; but all the purchases of the Dublin merchant have still been shipped, either for Irish or English ports; and a large portion of the other merchant's purchases have been conveyed to Drogheda, also by sea:—Of 1,350 cwts. of barley bought by him, only 330 cwts. have been carried to that town by land; but the wheat and oats, which he has bought, have been all conveyed by land to the principal mills, or to Drogheda.

The grain of this district is of superior quality, and is shipped for the English markets without being kiln-dried—which also occurs in other districts on the coast; but all the inland grain must be dried before being shipped.

Merchandize.

Coals, Rock-salt, Fish, Timber, Iron, Slates, Cotton Wool, Sugar, Tea, Whiskey, Tobacco.

There is an importation of coals, rock-salt, and fish.

Coals are conveyed from the port, westward, as far as the northern road, by Ashbourne; and although there is an extensive bog in that direction (Garriston), the use of coals predominates in the district. Families close to the bog consider the coals cheaper than turf. The average price of coals is 13*s*. per ton.

Fish, for the supply of Dublin, is brought into the port, and thence conveyed by land.

Timber, iron, and slates, are obtained from Drogheda, or imported, as required for use.

Cotton wool, for the spinners in the town, is carried to it both from Drogheda and Dublin.

The sugar, tea, and whiskey, consumed in the town, are brought from Dublin. Manufactured tobacco is bought, partly in Dublin and Drogheda: a considerable portion of the quantity consumed is spun in the town. The total sale of each is estimated to be, annually—52 tons of sugar; 4 tons of tea; 25 tons of whiskey; 2½ tons of Dublin and Drogheda tobacco.

Manufactures.

Cotton Spinning.

There are two cotton mills in the town, but, at present, only one is at work; and this gives intern employment to ninety persons, all but six of whom are females. The yarn spun, is worked into webs in the town and neighbourhood, excepting a small portion sent to Dublin for the general trade.

Weaving.

The looms employed in the town amount to 250; and 150 are employed by its manufacturers, at Garriston, about seven statute miles westward. It is estimated that there are obtained from the 400 looms, weekly, 100 pieces of chequers (containing each 60 yards, and weighing 20lbs.); 30 pieces of domestic calico (containing 80 yards each, and weighing from 20 to 30 lbs.); and 100 pieces of cotton drills and fancy goods (each containing about 43 yards, and weighing 12 lbs.). The weight of all made, weekly, would thus be 4,000 lbs.

The present employers of the weavers are two local manufacturers, and a Glasgow agency. Some weavers work solely on their own account; and their webs are carried for sale through the country, as are also the webs made for one of the local manufacturers, whose trade is confined to domestic calico, which he conveys about the country in carts, selling to private families, shop-keepers, and pedlars.

The chequers are sent to Dublin for sale. The drills, and other fancy goods, are sent to Belfast for bleaching, and are thence conveyed to Dublin or Glasgow. They are manufactured for the foreign trade. A portion of the cotton yarn, used by the weavers, is imported through Drogheda.

Embroidering.

The embroidering of muslin is carried on so extensively in Balbriggan and the neighbourhood, including Skerries, as to employ a portion of the time of at least one thousand persons, who earn, weekly, 2*s*. each, on an average of the whole year. The employment is derived through Glasgow and Belfast agencies. The muslin is delivered out to the workers, who embroider it at home; and then it is conveyed to Belfast for bleaching.

Hosiery.

There are thirty-six cotton stocking frames in the town, which employ fifty persons, members of twenty families, who receive among them £25 weekly. The stockings are sent to Dublin for sale, and the yarn for making them is thence received.

Salt-making.

The rock-salt imported, is used in a small manufactory in the town; the extent of which is not sufficient to occasion a carrying trade.

Travelling.

The intercourse with Dublin is increasing. A stage coach, from Drogheda, passes through every morning, and takes up passengers here daily. Two stage cars pass through every day, from Newry and Drogheda. There is also a stage car for the town, plying to and fro daily: it is capable of carrying twelve passengers. A Belfast and Dublin coach passes daily. A Newry coach passes through on alternate days.

17th January, 1837.

DROGHEDA.

Appendix B.

No. 4.
Inquiry into the Carrying Trade of the Towns north of Dublin.

DROGHEDA.
Agricultural Produce.

Wheat, Oats, Barley, Pease, and Beans, Vetches, Flour, Meal. Bran, and Malt.

There is a continual corn market in Drogheda. On Saturdays the general market is held, at which the farmers, near the town, sell their produce; but sales of corn are made to the merchants and millers, at their stores, on every day of business, by dealers, who buy the corn in other markets. Very large supplies are also sent into the corn stores and the distillery, by dealers in Navan.

Excepting vetches, none of the agricultural produce, classed as corn, is ever sent from Drogheda in a raw state to be sold in other parts of Ireland.

About 125 tons of vetches are annually sent to Dublin and the north of Ireland: a portion of the quantity sent to the north is shipped for Liverpool, and there reshipped for its destination.

A small quantity of malt, about 150 tons annually, is sent to Dublin, coastwise.

The great bulk of the corn carried to Drogheda, except that consumed in the distillery and breweries, is exported to England or Scotland, in either a raw or manufactured state.

I have obtained from the export merchants, the following totals of their annual shipments of each kind of corn, on an average of 1833, 1834, and 1835:—

Wheat, - -	5,375 tons	Pease and beans, -	1,025 tons
Oats, - -	3,500 „	Vetches, - -	500 „
Barley, - -	1,020 „		

Up to the present time, they have exported, of the corn of 1836, the following quantities:—

Wheat, - -	750 tons	Barley, - - -	950 tons
Oats, - -	3,062½ „	Pease and beans, -	625 „

Flour, bran, and oatmeal, are exported in much larger quantities, but the merchants ship only a small portion of these. In fact, their shipments of manufactured corn are limited to oatmeal, and have not exceeded an annual average of 2,036 tons.

Manufactured corn is exported by the millers in the town, and forwarded to it by millers whose establishments are along the Boyne and Blackwater rivers, some so far westward as Oldcastle, county Meath; also by those whose mills are on various smaller rivers in the counties of Meath and Louth. I transmit a list of all these millers, that they may be called upon for returns of the flour, bran, and meal sent from their establishments annually for export, or for consumption in Ireland.

If similar returns be obtained from all the mills in Ireland, and the quantities sent from the mills, near each town, be combined, the extent of the principal carrying trade in corn may be shown, without disclosing the extent of each miller's business.

The flour and meal exported through Drogheda, are the produce of grain originally purchased in Meath, Dublin, Kildare, King's County, Westmeath, Longford, Cavan, and Louth, by dealers, through whom it reaches the millers. A large portion of the flour and meal consumed in the town, is also from grain, the produce of remote districts; as Mr. M'Cann, the proprietor of the principal bakery of the town, has his mills at Navan, to the market of which grain is brought from all the counties named, except Dublin and Louth.

The distillery of the town is supplied with a large portion of the corn used in it, by dealers in Navan, who purchase it there from dealers, by whom it was bought, in other markets, from farmers. The malt used in distilling is chiefly from Ardee, county Louth, the market of which is remarkable for excellent barley.

Barley has been sometimes brought, coastwise, from Wexford and other districts; but now the local supply is sufficient, although the consumption is considerable, there being three breweries in addition to the distillery.

The increase in the local supply of barley, is ascribed to the low prices of wheat, in seasons preceding 1836, and partially to the occurrence of unfavourable weather at the period for sowing wheat, in 1835–6, which compelled many farmers to reserve the ground for spring crop; and it does not appear that they have suffered any loss by the change, there being a great demand for barley to supply the English markets.

Potatoes.

Potatoes are the only agricultural produce taken from Drogheda by land, in large quantities; and the carrying trade, thus created, only exists in spring, when the buying of seed becomes active: at that period great numbers of county Dublin farmers purchase, in Drogheda, Louth potatoes, which they consider better for seed than the produce of their own lands. The quantity of potatoes then removed from the local consumers is so great as to augment the market prices considerably; and, on some occasions, their removal has been lawlessly resisted.

Butter.

The butter sold in the market of the town, is entirely for local consumption. That which is exported is obtained from the county Cavan, whenever English orders are received. The export merchant, who receives the orders, apprises Cavan dealers of the supply required, and they forward it to him.

Eggs.

Eggs, for exportation, are bought in the local market; and although the exports exceed 2,000 crates in the year, the price, to the local consumers, has not been increased, having reference to other produce—so great is the supply which the export trade has drawn to the market.

Flax.

The flax exported, is not bought in the market of the town. It is obtained (as is also the flax used in the local spinning mills) from the counties of Cavan, Monaghan, and Armagh, and is destined for Dundee, to which it is conveyed by vessels carrying linen yarn from that town to Drogheda.

Cattle, Sheep, and Pigs.

The cattle and sheep exported, are principally sent in for the purpose from Meath and Louth. Pigs are brought in by dealers from remoter districts: the great supply is brought in on the Kells road, from places beyond Kells, and also places northward of it.

Merchandize.

There is a considerable carrying trade from the town, in timber, coals, iron, salt, slates, and cured fish. Of the timber imported, three-fourths are carried into the country—about one-fourth to the county Cavan. Seven-eighths of the iron imported are conveyed from the town.

There is, however, a canal along the Boyne, towards Navan, where the river is not navigable; and by this navigation, a great portion of the timber, iron, and coals, carried from Drogheda, is taken into the county Meath.

Coals are usually sold (averaging the prices of each kind) at 13*s*. a ton in summer, and 15*s*. in winter; but in the present winter, the price has been 29*s*., owing to adverse winds.

Appendix B.

No. 4.
Inquiry into the Carrying Trade of the Towns north of Dublin.

DROGHEDA.

Cotton wool is carried from the town to Balbriggan. The quantity imported, in 1835, amounted to 209,328 lbs.; and it appears there was an exportation in the same year, amounting to 154,560 lbs.; but this was part of the cargo of a ship wrecked at the entrance of the port.

The Scottish-cured herrings, imported in 1835, amounted to 7,000 barrels; but the importation is set down, in the Customs return, as having been only 3,800 barrels, which is about the quantity imported in 1836. The sale for local consumption is trivial: the greater part of the whole quantity imported is taken into Meath, Longford, and Cavan, by carriers from these counties; however, the demand is not good at present, in consequence of the distress occasioned by failures of crops, and also the high prices of fish. In 1835–6, the price of herrings was from 16*s.* 6*d.* to 22*s.* per barrel—the present price is 32*s.*

Merchandize.

Merchandize is carried to the town from Dublin, as well as imported, for the supply of retail traders.

Sugar, tea, wine, woollens, &c., are obtained, by land, from Dublin, in quantities far exceeding the imports. There is not a wholesale dealer in tea and sugar in the town, and the trade is entirely local, excepting the sales to petty dealers in neighbouring villages; consequently, the supplies are obtained, chiefly from wholesale houses in Dublin; but the facility of intercourse with Liverpool, and the power of having imports of all kinds (liable to duty) placed in the Customs stores until required for use, by which the goods may be bought in Liverpool without payment of the duty there, must speedily terminate the carrying trade from Dublin in these commodities.

Hardware and iron wares are imported for four establishments in the town; and about one-fourth of the light articles sold, is obtained from Dublin. The Liverpool agents of the Drogheda Steam Packet Company are required to act as brokers for all persons who get goods from England by the Company's vessels; and this tends to diminish the trade with Dublin.

The trade of Drogheda with England is increasing rapidly. There are five steam vessels belonging to the port, each of 240 tons register; and there is a ship on the stocks (a new object in the trade of the town), intended to be of 220 tons register.

Manufactures.

Linen Trade.

There is a steam power mill for the spinning of flax, which employs 450 spinners (about three-fourths females), and distributes £120 weekly in wages. Another mill, but of much less extent, is ready for work, and the erection of two mills (one of great extent) is in progress. For these establishments small companies have been formed, consisting exclusively of local capitalists.

The importation of British yarn into Drogheda, in 1835, amounted to 476,000 lbs., which gives a weekly average of 9,154 lbs.; and as a piece of unbleached linen of this town takes 60 lbs. of yarn, while the bleached yarn linen takes about 40 lbs., the quantity imported would be only sufficient for 183 pieces weekly, allowing 50 lbs. of yarn for each piece: this is more than 1,300 pieces under the average number now made in the town weekly.

Additional supplies of yarn are obtained from a mill at Navan, and large quantities are received by sea from Belfast. The coarse yarns of the town mills are also used; and supplies of hand-spun yarn are conveyed from the counties of Longford and Roscommon, either consigned to factors, furnished to manufacturers on order, or brought in by dealers. The whole quantity required in a year, for the manufacturing of the quantity of linen now made in the town, which is 1,500 webs weekly, allowing 50 lbs. of yarn for each, would be 3,900,000 lbs., or 1,741 tons.

The large mill in the town consumes ten tons of flax weekly, obtained principally from Armagh, Tanderagee, county Armagh, and Cootehill, county Cavan: about one ton, weekly, is taken from the general supply of the market.

So much of the yarn of this mill as is too fine for the local trade, is sent to the districts from which the flax is obtained, and part to England. The whole quantity made, is from 1,400 to 1,500 bundles weekly, weighing from six to twenty pounds each.

A portion of the linen made in Drogheda, is shipped in the port, for England; and the quantity at present conveyed to Dublin, by land, exceeds 400 pieces weekly. The remainder is distributed in small parcels, in various directions, and in the town trade. Allowing each piece to weigh only 50 lbs., 400 pieces would be 9 tons.

The Drogheda linen trade has declined since 1820. Its greatest prosperity was in the period from 1814 to 1820, during which the number of pieces made, weekly, averaged 4,000. The decline is ascribable to the successful rivalry of German linen in the Spanish markets, for which large quantities of Drogheda linen were regularly ordered before 1820, by a London merchant, named Oldham—also, to the increase of the linen trade at Barnsley in Yorkshire, and at Dundee, the manufacturers in each place having mill-spun yarn beside them.

The following totals show the number of pieces of linen, sealed in the market hall of Drogheda, by the officer of the late Linen Board, annually, from 1820 to 1834:—

1820, - -	53,697 pieces	1828, - -	20,018 pieces
1821, - -	61,866 „	1829, - -	16,645 „
1822, - -	61,246 „	1830, - -	20,659 „
1823, - -	50,603 „	1831, - -	20,816 „
1824, - -	41,944 „	1832, - -	16,566 „
1825, - -	43,573 „	1833, - -	19,910 „
1826, - -	32,795 „	1834, - -	19,254 „
1827, - -	25,244 „		

These totals include only a portion of the linen made for the town, the portion made for the general market by persons weaving on their own account, and then selling in the hall; a much greater number of pieces were made in each year for manufacturers, and not sent to the hall The largest of the totals here given, would only afford a weekly average not much exceeding 1,000 pieces; yet, even now, while the hall linen is so much decreased in quantity that the weekly average is under 400 pieces, the whole quantity manufactured for the town, weekly, is estimated, as already mentioned, to be 1,500 pieces.

The Drogheda linens are coarse—consisting of sail-cloth, sack cloth, canvas, ticken, coarse table and towel cloth, sheeting, and drills or trowser-cloth. The ticken and drills are principally for Belfast.

At present the trade is in a very depressed state. The manufacturers assert that they are losing two shillings on every piece, although they have reduced the weavers' wages.

In 1835, the trade was also in a depressed state—the high price of yarn leaving no profit on the cloth after paying weavers. The demand for England was so much lessened, that the whole quantity exported in that year, from Drogheda, was only 10,000 pieces, 5400 of which were for the orders of one merchant.

DROGHEDA.
Manufactures.

In 1836, the trade improved considerably, and the English orders were so augmented, that one merchant exported 8,940 pieces, being nearly as much as the whole quantity exported in 1835.

The weavers, (except those making fancy goods, such as drills,) cannot, at present, earn more than *5s.* a-week, with full work. In 1836, they could earn from *6s.* to *7s.*, while those on fancy goods earned from *2s.* to *3s.* more. Before 1826, a linen weaver, working for the manufacturers, earned *10s.* a-week.

When the price of yarn shall be lowered by the local mills, it is expected that the linen trade will improve, unless counteracted by an increased application of the power-loom in manufacturing British linen.

Cotton Trade.

There is now but little doing in the cotton trade. It does not employ more than fifteen looms in the town, and it is confined to checquers and domestic calico, principally sold through the country by the manufacturers.

When the linen trade declined, after 1820, the weavers found employment in the cotton trade, then in great activity—but this also declined, in the commercial panic of 1825–6, and many of the weavers migrated: some left the town previously, when their earnings, by linen-weaving, were much reduced. At present, weavers from Drogheda are to be found at Rouen in France, and in America, as well as in Manchester, Wigan, Barnsley, and in the neighbourhood of Dublin. This migration accounts for a diminution, exceeding one thousand, in the population of the town between 1821 and 1831, while, with reference to the best circumstanced portions of the country, there should have been (at the rate of 7 per cent. on the population of 1821) an increase of a greater number.

A revival of the cotton trade is expected. The erection of a large mill for the spinning of cotton has been commenced; and in this, power-looms are to be employed for working the yarn of the mill into cloth.

Leather Trade.

There are several leather manufactories in the town. Large supplies of leather are sent into Meath and Cavan. Some is sent to Dublin, a portion of which is ultimately consumed in Waterford.

The only leather brought to the town is the superior description of upper leather, which is procured from Dublin, but gives very little employment to carriers.

Bark and Valonia, for the manufacturers, are imported from England, and large supplies of the former are obtained from Dublin, by sea.

Some hides are also brought to the town by sea, but the local supply is very large.

About six tons of glue are made annually, by one of the leather manufacturers. A great part of it is sent to Dublin, and the remainder goes into the local trade, and to the counties of Meath, Longford, and Cavan.

The shoemaking trade is local. However, on one occasion, about a year since, an English dealer arrived to purchase shoes, and took away 1000 pairs.

Distilling.

In the last year, 2200 puncheons of whiskey were sent from the distillery of the town, to places westward, principally to Navan, Mullingar, Longford, and Cavan. The remaining quantity manufactured went into the local trade.

Brewing.

The trade of the breweries is very extensive. A large quantity of ale is sent to Dublin—it is said, 30 tons weekly; and a considerable quantity is also sent to Dundalk and Newry. A barrel of beer weighs 3½ cwt.

Tobacco Trade.

About 36 hogsheads of tobacco are used annually by manufacturers, in supplying the local trade, and some of the inland towns.

Soap and Candle Trade.

A very large quantity of soap and candles, manufactured in the town, is conveyed, for retail, into Meath and Cavan, by the carriers who arrive from those counties with agricultural produce.

Iron Works.

A manufactory for steam boilers, &c., has been recently established. There is also an iron foundery.

Salt Works.

There are six salt manufactories, which consume, annually, about 6000 tons of rock-salt. The demand for manufactured salt, to be retailed in the interior towns, is very great.

It appears, by the Customs returns, that there is a considerable quantity of manufactured salt imported; but nearly the whole of it is sent on to the Orkney islands, for the establishment of a curer of herrings, resident in Drogheda.

Brick Works.

Red bricks, of fine quality, are made near the town, and are sold, at the kilns, for *30s.* a thousand.

Travelling.

A coach, for sixteen passengers, plies between Drogheda and Dublin daily; and two long cars, each for the same number of passengers as the coach. There are also several coaches passing through, to and from northern towns, but they seldom take passengers from Drogheda, except strangers, or persons having occasion to go northwards.

There were two coaches, plying daily between the town and Dublin, as well as small cars drawn by one horse; but one of the coaches has been withdrawn since the long cars were started.

It is thought that the intercourse with Dublin is not increasing, or likely to increase.

Formerly, the traders of the town had to make all their payments in Dublin: now, a large portion of them must be made in Liverpool; and the principal number of them are made in the town, there being in it a branch establishment of the Bank of Ireland, and another of the National Bank (the latter in connexion with a Bank of Issue at Longford), in both of which bills are discounted, which formerly should have been presented for discount in Dublin.

It is now the practice of some traders, to make their acceptances payable in Drogheda.

19th January, 1837.

NAVAN, COUNTY MEATH.

NAVAN.

Agricultural Produce.

There is a general market in Navan on Wednesdays, for the agricultural produce of the surrounding country; but its largest supplies of corn are purchased for it in other towns, some of which are in the adjoining counties, by market dealers, who are very numerous in the county of Meath. Large supplies of corn are sent in through the week by a superior class of dealers; Mr. C. Gasteen of Clonard, on the southern boundary of Meath, who buys Corn for Navan, in Meath, Kildare, and King's County; Mr. Callery, of Trim; Lynch, of Athboy; Reynolds, of Castlerickard; Monaghan, of Clonmellan, in Westmeath; and Messrs. Tormy, of Crooked Wood, near Mullingar, who buy corn in various markets

Appendix B.

No. 4.
Inquiry into the Carrying Trade of the Towns north of Dublin.

NAVAN.
Agricultural Produce.

Wheat, Oats, Barley, Flour, Bran, Meal, and Malt.

which they assort and resell. Mr. Gasteen sometimes sends to the Navan stores of Smith and Smyth (owners of extensive mills at Drogheda), 7 tons of oats in a week; and his weekly sales at these stores, throughout the season, average 3½ tons.

There are several large mills at Navan, one of which belongs to the principal bakery in Drogheda, and the flour is conveyed there by boats on the Boyne and its canal. These mills, and the granary of Smith and Smyth, of Drogheda, with the consumption of a distillery and brewery, and the competition of a numerous body of dealers, who buy corn in Navan to resell in Dublin or Drogheda, or at mills near it, maintain a continual corn trade in the town, and occasion employment for a great number of carriers, in conveying corn to it from the interior, and from it towards Dublin and Drogheda. One of the mills at Navan (Mr. Gerrard's, of Liscarton), is chiefly supplied with oats, by an agent at Virginia, in the county Cavan.

The quantity of flour, bran, and meal, carried to Drogheda and Dublin, will be shown by the returns of the millers, which they are furnishing to the Commission. It will be seen, that of the quantity carried to Drogheda, a very large portion is conveyed by water, in the millers' boats, which are also employed for carrying back coals and other imports.

I have found it impossible to ascertain the quantity of raw corn sent either to Drogheda or Dublin, as, of the numerous buyers in the town, regular accounts of the corn bought and sent away, are kept only at the stores of Smith and Smyth, and of MacLogblen & Co.

Corn carried to Drogheda.

The information collected among the dealers, has enabled me to estimate the whole quantity of raw corn sent to Drogheda, or to mills on the line between Navan and that town, at 5,270 tons annually.

A very large portion of the raw corn carried towards Drogheda, is conveyed on the carts of the dealers—and if these persons be offered a good price at any of the intermediate mills, along the Boyne, the corn is sold there. A considerable portion of the raw corn is carried to Drogheda in boats. Of the very large quantity purchased for Smith and Smyth, in the last season, but little more than a third was conveyed on carts.

Corn carried to Dublin.

The trade in raw corn, to Dublin, is estimated by Edward Scott, a principal carrier in Navan, to employ 15 carts, weekly, from the end of October to the end of April, 26 weeks; and if each were to carry 18 cwt. (Scott says the loads, averaging each kind of grain, do not exceed 18 cwt.)—the whole quantity conveyed in the period would be only 351 tons. He also states, that double the number of loads are carried to Dublin, from April to September—say 20 weeks, during which Dublin prices invite more trade in that direction. In this period, therefore, the whole quantity carried would be 540 tons.

The corn carried to Dublin, throughout the season, would thus amount to 891 tons.

Potatoes.

The carrying trade in potatoes is to Dublin. It employs, on some days, as many as 50 carts. About 80 loads are conveyed weekly, during the season of 30 weeks; and taking the load at 16 cwt. (a mean quantity), the whole weight would be 1920 tons.

This trade is confined to cart owners; "and," says Scott, "they sometimes make less than the rate of carriage, sometimes more." It is the potatoes called cups which these carriers deal in; and these are, at present, 2*s.* per cwt. in Navan.

Butter.

The carrying trade in butter is also to Dublin, and is confined to one person, James Rice, who buys in the Navan market, and is also supplied by other carrying dealers, who collect butter in various markets. He pointed to two carts at the door of his cabin, containing butter in kishes, collected through the county Cavan, which he intended to assort, and pack in tubs, for Dublin.

Rice sometimes takes two carts of butter to Dublin, in the week, when there is a rise in the city prices; but the whole quantity in the year does not give a weekly average of more than a ton, being, in all, 52 tons. There is not any sent to Drogheda.

Pigs, Sheep, Wool, Flax, Hides, Skins.

There are bought, weekly, in Navan, for Dublin, about eighty pigs, taking an average of the year, and about one hundred are conveyed through, for the same destination—the whole amounting to 9,360.

The sheep and lambs sent from Navan, and through it, in the year, to Dublin, are estimated to amount to 27,300.

The wool, flax, and hides, are all bought for local manufacturers. It is only sheep skins that are redundant, and these are sent to Dublin, the wool being first taken off.

Merchandize.

Annual Consumption of Merchandize.	Whence obtained.
Timber (plank), 200 tons.	The greater part from Drogheda. One trader is, at present, receiving about 20 tons from Dublin.
Iron (all kinds), 200 tons.	Nearly all from Drogheda. The trade in timber and iron is confined to retailers.
Slates.	There are large quantities of slates brought from Drogheda in the boats, but there is no sale of them in Navan.
Salt, 50 tons.	All from Drogheda.
Coals, 3,500 „	There are three coal yards in Navan, supplied from Drogheda by boats; and the 3,500 tons here set down form the total of their trade in a year; but a considerable quantity is brought up in addition, by the owners of the mills, and for the distillery and brewery. Several country gentlemen also get supplies from Drogheda, by the boats, to the landing places nearest their residences. The usual price of domestic coal, in the town, is £1 per ton. It is considered here to be cheaper than turf; but the cabins being without grates, coal cannot be used in them.
Sugar, raw, 140 hhds.	Nearly all from Dublin.
Sugar, refined, 35 „ (102 tons)	
Tea, 12 tons. (320 chests of 84 lbs. each.)	About six tons of tea are bought in Dublin. Two tons are obtained through Dublin, from London. The remaining four tons are obtained from Liverpool, through Drogheda.

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No. 4.
Inquiry into the Carrying Trade of the Towns north of Dublin.

NAVAN.
Merchandize.

Annual Consumption of Merchandize.	Whence obtained.
Coffee, 16 cwt.	Dublin.
Wine, 14 pipes and butts.	do.
Spirits, 320 puncheons.	120, Navan. 150, Dublin. 50, Drogheda. There are forty houses in Navan licensed to sell whiskey.
Hardware, glass, and earthenware.	About £2000 worth of hardware is sold here in the year: one-third of it is obtained through Drogheda, the remainder from Dublin. The sale of window glass (all obtained from Dublin agents) extends to sixty crates, yearly. The principal sale of earthenware is by travelling dealers; the local trade is insignificant.
Tobacco, - 10 tons, (all manufactured.)	About one-half from Dublin—the other from Drogheda.
Tallow, - 80 „	All from Dublin, or through it.
Ashes, barilla, and kelp, - 40 „	do. do.
Soap.	In addition to the white soap made in the town, about 15 tons are annually obtained from Dublin. 30 tons of yellow soap are received, through Drogheda, from Liverpool.
Starch, 10 tons.	All from Dublin.
Flax seed.	The sale of flax seed in Navan is inconsiderable. The whole quantity sown throughout Meath, in 1821 (according to the accounts of the late Linen Board), was only 90 hogsheads.
Bark, 25 tons.	All from Dublin.
Oil, 2 „	do.
Woollen drapery, &c., &c.	Scott, the carrier, states, that three carts would, in one turn, convey all the woollens, cottons, &c., brought to Navan in a year. The principal supply is from Dublin.
Leather.	There are two tanners and leather dressers in the town, and the greater part of the leather used here is supplied by them.
Flax, - - 234 tons, (exclusive of local supply.)	Obtained from Cootehill, Ballybay, Armagh, and Londonderry, all northward of Navan.
Linen yarn, - 150 tons, (exclusive of local supply.)	Obtained from Dublin and Drogheda.

Manufactures.

Linen Yarn.

There is a linen yarn mill near the town, possessing a thirty-six horse power, to which a fifteen horse power is about being added. It employs 230 persons; works into yarn annually, 234 tons of flax, obtained from Cootehill, Ballybay, Armagh, and Londonderry; consumes 200 tons of coal, obtained from Drogheda by the Boyne navigation; and sends to Drogheda on carts, weekly, 600 bundles of yarn, weighing each (on average,) 7 lbs., in all, $37\frac{1}{2}$ cwt., being $97\frac{1}{2}$ tons in the year. The rest of the yarn is distributed in various directions, or used in Navan.

A small quantity of flax is obtained here, in addition to the quantity from the North, but the quality is inferior.

Sack Cloth, &c.

Sack cloth and packing covers are manufactured here. The principal manufacturer of them states, that 200 looms are employed, and that each weaver can earn 10*s.* a week. The webs measure usually from 100 to 120 yards; but some (for packing covers,) measure 180 yards; and the cloth is yard wide. The average weight of the webs is $1\frac{1}{4}$ cwt.; and a weaver can make one in a week at ordinary work; therefore, if only 50 looms were constantly employed, the webs made in a year would weigh 160 tons, which is 10 tons more than the weight of the yarn carried to the town. The principal part of the cloth is sent to Dublin; some is sent to Newry, some to Dundalk, and a large quantity to Drogheda.

Woollen Cloth.

There is a manufactory for coarse woollens near the town, which employs thirteen persons and five looms; but it has only been at work since August, 1835. The proprietor, Mr. Ford, formerly the conductor of an establishment in Dublin, settled here in expectation of obtaining a large and cheap supply of wool; however, although wool is abundant in every market of the county, the price is high, so great is the demand for it, to be used in making frieze for local use; therefore, he has adapted his trade to the practice of the country, and receives wool from families to spin, dye, weave, and finish. He charges 10*s.* for thus manufacturing a stone of wool into ten yards of frieze; and he calculates that there is a saving of 5*s.* on each stone of wool, to the families who resort to his establishment, as the home manufacturing of that quantity of wool, costs at least 15*s.* This portion of his trade is increasing considerably. The frieze manufactured on his own account, is sold at his establishment to travelling dealers.

Paper.

Under the same roof with Mr. Ford's establishment, there is a paper-mill, in which lapping paper is made for the local trade, and also for Dublin. The proprietor, Mr. Browne, states, that between paper, rags, and old iron, he sends to Dublin one ton weekly.

Travelling and Carrying.

Three day coaches and a night mail pass through Navan, from Dublin and to it; but, one of the day coaches does not ply on Sundays. A long car also passes through daily, from and to Dublin; and a car plies daily between the town and Drogheda.

About fifty carts are permanently employed by the carrying trade of the town; and upwards of 100 carts, belonging to holders of small farms in the neighbourhood, are employed occasionally.

Scott, the carrier, states, that the general trade with Dublin does not employ more than fifteen carts, making two turns in each week.

The charge for the carriage of goods between the town and Dublin, is 16*s.* 8*d.* per ton; but, in some cases, the charge is only 15*s.*

The general charge for carrying, between the town and Drogheda, is 6*s.* 8*d.* per ton.

The Boyne Navigation.

On the Boyne Navigation the charge is only 4*s.* per ton, and this includes a toll of 2*s.* 3*d.*, leaving the charge of the boat-owner only 1*s.* 9*d.* per ton.

There are eight Navan boats employed; and boats from Drogheda frequently ascend to Navan to take down corn.

The navigation is considered a very bad one. It is partly canal and partly river, and at three places the towing path breaks off, and the horse is taken on the boat to the opposite side of the river, where

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NAVAN.

another path begins. At a distance of two miles from Drogheda, the navigation enters that part of the Boyne which is affected by the tides, where necessarily there is much delay, particularly in the short days, (the period of the corn trade,) and considerable danger. During floods great delay is occasioned in ascending the river; and, at a place called Mooney's Sharp, the current is sometimes so strong, that five horses are required to draw the boat for the distance of a furlong.

The exact quantity of commodities conveyed by this navigation in a year, may be ascertained by ordering an account of it to be furnished by the Secretary of the Company, the Rev. R. P. D. Hamilton, of Ardsalla, near Navan.

9th February, 1837.

TRIM.

TRIM, COUNTY MEATH.

Corn Market.

Corn is bought in Trim for two mill-owners in the town, and two near it; also by dealers who live in various directions, and whose transactions cannot therefore be ascertained, but the greater part of the corn collected by them is resold in Navan. In my report from Navan I have included Callery, of Trim, among the principal dealers who resell in that town.

The price of wheat in Trim is usually 2*s.* a barrel under Navan, and oats about 1*s.*: the differences between the prices of Trim and Dublin are something more. A difference of 2*s.* a barrel in wheat, is equal to 16*s.* a ton; and 1*s.* a barrel in oats is equal to 11*s.* 5*d.* a ton.

The corn of this part of Meath is not of superior quality, which is by some persons ascribed to the soil, and by others to bad husbandry.

Carrying Trade.

The trade of Trim and its neighbourhood is principally with Dublin and Navan. Loading is conveyed there for 13*s.* 4*d.* per ton.

Coal is obtained from Navan; but turf fuel is almost generally used.

Twenty-two carts, (on average,) each conveying about a ton weight, pass through Trim daily, plying between Dublin, Trim, Athboy, Castlepollard, Granard, &c., on the western road; and Oldcastle, Killysandra, &c., on the northern road, leading to the district west of the town of Cavan.

ATHBOY.

ATHBOY, COUNTY MEATH.

No Corn Market.

There is not a corn market in Athboy; but there is an extensive mill in the town, for which supplies of corn are purchased from the farmers of the surrounding country, and in Navan.

A number of dealers in pigs and corn reside here, and make their sales in Navan, at the markets of which they attend regularly.

Potatoes are extensively cultivated in this part of the county Meath, and are at present so abundant, that the current price is only 1*s.* 4*d.* per cwt.: it was, however, more than 2*s.* per cwt. in the early part of the season.

The principal trader in the town employs his own carts to convey his supplies from Drogheda and Dublin.

KELLS.

KELLS, COUNTY MEATH.

Corn Market.

The corn market of Kells receives but limited supplies; depending for them on the produce of remote farms on the northern border of the county, and the adjoining districts of Cavan.

The local authorities of the town state that they cannot furnish an account of the produce sold in the market, although they collect tolls on all commodities brought to it, charging on corn a penny per barrel. However, there is not any trader here in extensive business, who buys produce for resale elsewhere, or for exportation. Market dealers buy corn here, and take it on towards Navan and Drogheda for resale.

Trade.

The general trade of the town is inconsiderable. There is a large consumption of whiskey, but not of any other merchandize.

The lands about Kells being mostly reserved for pasture feeding, the labouring population depend for subsistence on occasional employment, (chiefly turf cutting,) and the sale of pigs; and all suffer great poverty. The only town avocation which affords much employment, is the embroidering of lace for English establishments, in which upwards of sixty females are at present engaged; but occasionally more than one hundred are employed.

Carrying.

Carts loaded with corn, or other Irish produce, are continually rolling through the town; the greater number taking the route to Drogheda, keeping north of Navan, by crossing the river Blackwater, a short distance eastward of Kells, and thence on to Slane. Several droves of pigs also pass through daily.

The road northward, through the centre of Cavan to Enniskillen, also that through Oldcastle to the districts west of Cavan, and the western road to Castlepollard and Granard, unite at Kells; so that all the Irish produce for Dublin, from the districts through which the first-mentioned road passes, and all for Drogheda, or Navan, on the three lines, must be carried through Kells. The imports from Dublin, for places on the first of these lines, and from Drogheda on the three lines, must also pass through Kells.

I observed a great number of carts returning through the town empty; but whether they belonged to dealers, who had been selling corn in Navan, or Drogheda, or to regular carriers, I had no means of ascertaining. Of course, the carrying of agricultural produce to the coast markets, must employ more carts than the carrying of merchandize to the interior, owing to the non-existence of inland manufactories requiring materials from the ports, but more especially to the condition and habits of the great body of the population, which as yet depress the sale of merchandize, and also to the heavy charges of inland carriage which prevent an extensive use of coal.

Coal is only partially used even in Kells, although retailed in Navan (only 10½ statute miles distant,) at £1 per ton. There are, however, large bogs in the vicinity.

Travelling.

A three horse coach, for fourteen passengers, plies daily between the town and Dublin; also a long car for the same number of persons. Two stage coaches pass through daily, and a mail coach nightly.

OLDCASTLE, COUNTY MEATH.

OLDCASTLE.

The market of Oldcastle furnishes supplies of corn to extensive mills near the town, and provides employment for a considerable number of dealers in corn, and other produce. As nearly all these dealers reside elsewhere, it is impossible to obtain an account of the exact quantities of produce carried away for resale or exportation; but an estimate of the quantities sold in the town has been formed, with the assistance of the craner and a resident dealer, and transmitted to the Commissioners.

11th February, 1837.

DUNDALK, COUNTY LOUTH.

DUNDALK.

Agricultural Produce.

The corn trade of Dundalk is very extensive, there being a steam power mill, a large distillery, and two breweries in the town, and the export trade comprising a large portion of the produce of Louth, Cavan, and Monaghan.

Wheat, Barley, and Oats.

The wheat and barley sold in Dundalk are the produce of Louth and Monaghan. The supplies of oats are obtained, principally, from the counties of Cavan, Monaghan, and Fermanagh; the quantity grown in Louth being only sufficient for the local consumption. This is shown by contrasting the Customs returns of exports in 1835, with the returns of sales made in Dundalk.

Exports in 1835.

Wheat, - - -	142,097	cwts.
Wheatmeal and Flour,	16,280	„
Barley, - - -	56,280	„
Malt, - - -	53,875½	„
Oats, - - -	229,542¾	„
Oatmeal, - -	129,260	„

Sales in Dundalk during 1835.

Wheat, - -	242,100	cwts.
Barley, - -	377,074	„
Oats, - -	146,037½	„

Adding the sales of oats at Castlebellingham in 1835, 3500 cwts, also the sales at Ardee, 73,400 cwts., the total is under the exports, leaving none for oatmeal.

The sales of corn in Castlebellingham, given in the return for that village, are made at the great brewery there, also to the mills near it, and at a coach-horse establishment. There is not a regular corn market.

In Ardee there is a great corn market, from which millers and maltsters are largely supplied; and dealers buy corn in it to resell in Dundalk and Drogheda. The quantity resold in Drogheda is estimated to average 62½ tons weekly, for three months of the year.

If the Louth oats be only sufficient for the local consumption, which is the opinion of a principal corn merchant in Dundalk, a quantity of oats, and oatmeal, equal to the exports of 1835, viz., 17,940 tons, must have been obtained from the counties of Monaghan, Fermanagh, and Cavan.

The exports of agricultural produce from this town are increasing annually; the millers' exports of flour and meal in particular. The steam-power mill here, has been erected by an English miller, Mr. Dewhurst, who has settled in the town.

Butter and Eggs.

The butter exported is brought in from the counties of Monaghan and Cavan, and the northern part of Longford. The quantity is about 550 tons in the season; all sent ready coopered for shipment.

The eggs sent in are collected in the same counties, principally; the local supply being much under the quantity exported.

Cattle, Sheep, and Pigs.

The horned cattle and sheep, in the export return, are from Louth and Meath; the pigs are from Louth, Armagh, Monaghan, Cavan, Leitrim, and the northern parts of Longford and Meath.

Flax.

The flax and tow exported are chiefly from Ballybay, county Monaghan, and Cootehill, county Cavan.

Merchandize.

A great importation is made of timber, iron, slates, and coals, for traders in the counties of Monaghan and Cavan, who obtain their supplies through this port, from England, and employ the carriers of corn to convey them from the ships, or their agents' stores.

The steam vessels bring in supplies of all kinds of merchandize, consigned to traders in the inland towns.

In imports generally, there has been a great increase since the establishment of these steam vessels for the port; and the principal traders in Dundalk itself, now purchase the commodities in which they deal, at Liverpool, Manchester, Leeds, Birmingham, &c.

The carrying trade, occasioned by bringing supplies from Belfast, Newry, and Dublin, is still, however, considerable. About one-third of the whole quantity of flax seed sold in the town is brought from Newry, and the greater part of the sugar and tea is carried from Belfast, and Newry, or Dublin; but the merchants state that the local trade will soon be fully supplied by imports from Liverpool, and those from foreign countries, and the colonies; there being great advantages derived from this direct trade, among which is the power of postponing the payment of Customs duties until the merchandize chargeable with them is required for sale, instead of having to pay them in Belfast, or Dublin.

The coals imported are from Scotland, and Wigan. The price of Scotch coal is usually 12*s.* per ton; of prime Wigan, 15*s.* to 17*s.*; and of inferior Wigan, 12*s.* 6*d.* to 14*s.* In the present winter, prices have been considerably higher. Turf fuel is also consumed in the town, there being large bogs in the neighbourhood; but at the ordinary price of the turf here, this fuel is considered dearer than coals.

Two steam vessels, the property of a Dundalk Company, ply regularly between the port and Liverpool. Each has a capacity of 200 tons register.

The port has not much depth of water; but it is said to be a safe one, in proof of which, a freight will be taken for it in an English port at less than the charge for a freight to Newry, or Drogheda. There are not any harbour dues.

Appendix B.

No. 4.

Inquiry into the Carrying Trade of the Towns north of Dublin.

DUNDALK.
Manufactures.

The Irish manufactures carried to the town in considerable quantities, by land, are linens. These are conveyed from the neighbourhood of Ballybay, county Monaghan. At Lough Eagish, near that place, there is a linen yarn mill, with a weaving establishment annexed to it, giving employment to a large number of persons.

The Irish manufactured articles carried from the town, in heavy loads, are salt, whiskey, and flour.

There is a large importation of rock salt for works in the town, the produce of which together with imported salt (manufactured), is carried in great quantities to the counties of Cavan and Monaghan.

The distillery supplies whiskey to dealers in Louth, Meath, Westmeath, Roscommon, Leitrim, and Fermanagh; but its heaviest trade, (exclusive of that in Dundalk,) is in the counties of Cavan, Monaghan, Armagh, and Down.

Flour. Flour is supplied by Dundalk millers to many towns in the north of Ireland. A large quantity is sent to Newry on carts, and thence forwarded by boat on the canal for consumption in Tyrone. The town of Ballybay, county Monaghan, is supplied altogether by Dundalk.

Beer. There are two breweries for ale and porter in the town, but they supply only the local demand.

Tobacco. The tobacco made in the town is also for local consumption. Heretofore the spinners of tobacco in Dundalk obtained the unmanufactured commodity through Newry or Drogheda; but, in 1836 permission was obtained for bonding tobacco in Dundalk, in consequence of which, the supplies are received directly from Liverpool.

Soap. The ashes and tallow imported, are for soap manufacturers in the town, who send supplies of their soap to the interior.

Leather. The bark and hides imported, are also for local use; and large supplies of Dundalk leather are conveyed to inland towns.

Bricks. Red bricks are made near the town, the best of which are sold for 30*s.* a thousand; but they do not occasion a regular carrying trade to other towns.

Pins. A pin manufactory was established here in 1836, by Messrs. Johnston and Sherrock, of Manchester, who could not obtain at their English establishment a sufficient number of hands for their trade. When they were commencing business here, objections were made against their taking the children to be employed, from school, and they could only get the number available, gradually. It was ultimately agreed on, that the children should be at liberty to attend the school for a portion of each day; but, in a few weeks, when the children acquired expertness in pin-making, and found that by attending to their employment they could earn 4*s.* a week each, by sedulous labour, they refused to go to the school and devoted all their time to business. There are now 260 of them employed, being as many as could be obtained of fit ages; and the proprietors of the mill are looking for the site of another establishment in a populous part of the county Louth.

Travelling. Three Belfast coaches pass through the town daily, to and from Dublin; and one Newry coach, and one Armagh coach pass through, to and from Dublin, on alternate days; a long car from and to Newry, also passes through daily. These vehicles afford ample means of intercourse with Dublin, for the inhabitants of Dundalk.

There are two cars plying, daily, between the town and Newry.

From the period at which the private bankers of Dublin were opposed in provincial towns, by the establishing of branches of the Bank of Ireland, the banking business of Dundalk was carried on in Newry, until the Bank of Ireland established a Dundalk branch. There is now, in addition to this bank, a branch of the National Bank, in the town; and in consequence of the existence of these local banking establishments, and of the maintenance of a regular commercial intercourse by steam vessels with Liverpool, the intercourse with Dublin is very limited.

21st January, 1837.

CAVAN.

CAVAN.
Agricultural Produce.

Wheat, Barley, Oats. Wheat and barley are only brought to Cavan in very small parcels, and occasionally. The sales are made at the neighbouring mills, or the Belturbet distillery. The quantity of either grown near Cavan, is not considerable; but the cultivation of wheat is increasing very much.

The annual sale of oats is estimated to be 7525 tons. A large portion of the quantity bought in the town is for the neighbouring mills; fully one-half is supposed to be bought for one mill in the county; a large quantity is bought for another mill. It is also stated that considerable purchases are made in the market for the distillery in Belturbet. The quantity taken away by dealers to Dundalk and Drogheda, cannot be ascertained, as the dealers do not reside here.

Potatoes. The potatoes sold are wholly for local consumption. One estimate of the quantity extends only to 2600 cwt. in a year, which would be only 400 stones of 14 lbs. per week: this must be greatly under the true amount, unless all but a few of the inhabitants, cultivate supplies for themselves.

Butter. The annual sale of butter amounts to 200 tons, the greater part of which is sent to Newry, and Dundalk. Some of the travelling dealers take it to other inland towns. When in Navan, I saw butter there from Cavan, which was to be resold in Dublin.

Flax. A considerable quantity of flax is sold, but it is all bought by travelling dealers to resell to buyers in Cootehill, Monaghan, and other towns, who supply the yarn mills of the county Armagh, and at Belfast; also those in Drogheda, and Navan.

There are not any linen weavers near Cavan, which has never been a linen market. There is not a yarn market.

Wool. The quantity of wool sold here annually, is about 14 tons. About half the quantity is bought up in small parcels for domestic manufactures; the remainder is sent to Dublin, by a trader here, who also sends there about 80 cwt. of Fermanagh wool; in all, he sends from ten to twelve tons annually.

Pigs. The number of pigs sold at Cavan cannot be ascertained; the sale takes place outside the town, and no enumeration of the pigs at market here has ever been made.

Hides and Skins. The hides and skins are bought up by tanners, and leather-dressers in the county. Some sheep skins are sent to Dublin.

Merchandize. The principal supply of flour is now obtained from the local mills. However, about 30 tons of flour from Drogheda, Slane, and Dundalk, are sold in the town annually.

Oatmeal is obtained from the neighbouring millers.

Coals. The annual supply of coal for sale is usually about 70 tons, all obtained from Dundalk; but in the

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CAVAN.
Merchandize.

present year the sale has been greater, owing to the necessity there is for burning coal with the turf, which is so bad, in consequence of the heavy rains, that it will not burn well without coal or wood.

Exclusive of the quantity of coal sold in Cavan, large supplies are obtained from Dundalk by some families in the neighbourhood. For kilns, &c., large supplies are obtained. The Ballyhaise mill requires, at least, 100 tons in the year.

The Belturbet distillery is supplied with coal through Ballyshannon and Lough Erne.

One trader estimates the quantity of raw sugar sold, at only 50 hogsheads; another estimates it at 100 hogsheads. The medium of 75 hogsheads would weigh about 45 tons, or 900 cwts. All from Dublin.

Sugar (Refined.)

The sale of refined sugar, by grocers, innkeepers, &c., is said not to exceed 5 hogsheads in the year, or 2½ tons. All from Dublin.

Tea.

Sixty chests of tea, (exclusive of packages obtained from Dublin, by innkeepers and private families,) are considered to be as much as can be sold in the town; these would weigh 2½ tons. The whole supply is from Dublin.

Coffee.

One trader in the town sells about 8 cwt. of coffee in the year, but all the others do not sell more than 2 cwt. The supply is from Dublin.

Spirits.

A wholesale trader estimates the annual consumption of whiskey in the town at 100 puncheons; another trader estimates it at 300 puncheons Looking to the estimate for Navan, which is only 300 puncheons, notwithstanding the greater trade of that town, I must consider the lesser estimate nearer to the actual sale, and therefore set it down at 50 tons. The greater part is obtained from Belturbet, and Carrickmacross; but a considerable portion is obtained from Dundalk distillery.

Beer.

Beer is obtained from Clones, Monaghan, and Carrickmacross. The quantity cannot be ascertained.

Wine.

The sale of wine is estimated at from 7 to 10 pipes and butts.

Salt.

The salt is obtained from Drogheda, and Dundalk, or Newry. One trader sells about 300 cwt. annually, and travelling dealers sell it from their carts in the market-place. The total does not exceed 50 tons.

Tobacco.

The tobacco brought to Cavan is unmanufactured. It is purchased in London, and conveyed in bond to Dublin, where the duty is paid. The duty amounts to between £36,000 and £40,000 a year, and this is all paid by one manufacturer. He averages his consumption at 4 hogsheads for every eight days, each hogshead weighing about 15 cwt. On comparing this average with the duty, I estimate the whole weight at 115 tons. The manufacturer purposes to get his tobacco through Dundalk, if freights to that port from London shall be easily obtained. He sells the manufactured tobacco to dealers in the counties of Cavan, Meath, Westmeath, Longford, Leitrim, Fermanagh, and Monaghan.

Soap and Candles.

About 100 cwts. of the white soap are purchased in Clones; the greater part of the remainder, white and yellow, is obtained from Dublin, or through it. The total (with candles) does not exceed 20 tons.

There are two chandlers in Cavan; but large supplies of candles are obtained from Clones, and mould candles are got from Dublin.

Starch.

A principal trader estimates the quantity of starch sold, at 4 tons, and another trader makes it 5 tons. The latter would be half the quantity estimated to be sold in Navan, and therefore I adopt it. The supply is from Dublin.

Leather.

At least 6 tons of leather are brought to the town from Dublin and Drogheda. There is a tanner in the town, and another at Ballyhaise, near it.

Bark.

It is Irish bark that is principally used by the local tanners. Some imported bark is obtained from Dundalk and Newry.

Timber and Plank.

About 220 tons of timber and plank are obtained for the supply of the town. The timber has been imported through Ballyshannon, and formed into rafts on Lough Erne, by which it has been conveyed to Wattle Bridge. However, the delays on the lake, from contrary winds, are so great that it is doubtful whether the trader to whom the sale of timber is confined, will get any more by Ballyshannon.

About 60 tons of Memel are included in the total of 220.

The great demand is for plank, and Dundalk is the port through which the principal supply of it is obtained.

Iron and Metals.

The supply of iron and metals is obtained through Dundalk and Newry. The metals are ordered from Glasgow to either of these places, principally to Newry. The whole quantity is considered to weigh 70 tons.

Tin Plates.

Tin plates are obtained through Dundalk—about 2 tons.

Hardware.

Hardware is ordered through Drogheda, Dundalk, and Newry, as may be convenient, when the packages are to be shipped from Liverpool; the total, about 2 tons.

Lead.

Lead is obtained from Dublin, and partly through Drogheda from England. Total 3½ tons.

Flax seed.

The sale of flax seed has been increasing in latter years, but it is impossible to estimate the quantity sold in the town, as a very large portion of the supply is brought in to each market by travelling dealers, who, during the season, carry the seed from one town to another, returning to Dundalk, Newry, or Belfast, for supplies, as they are required. The whole quantity sown in the county in a year is estimated at 1,250 hogsheads, in the last returns of the late Linen Board.

Woollens and Cottons.

The number of bales of drapery cannot be ascertained; a considerable portion, at least half the quantity sold, is purchased in Leeds, Manchester, &c., and ordered to Dundalk, Newry, or Dublin, and the remainder is bought in Dublin.

The general trade of Cavan is annually increasing. There is, however, considerable distress among the poorer classes of the people, but much of this is only temporary, arising from the inclemency of the past autumn, and the high prices of provisions and fuel.

Travelling and Carrying.

There is a day coach for 16 persons, plying between Cavan and Dublin. A day coach from, Enniskillen passes through; and a mail coach from that town passes through in the night; in both seats are reserved for Cavan.

I could not ascertain the number of carts employed between the town and Dublin, Drogheda, Dundalk, &c., as a considerable portion of the carrying trade devolves to travelling dealers, who take corn, butter, flax, eggs, &c., from the town.

The charge for carrying merchandize from Dublin is 2*s.* 4*d.* per cwt., and from Newry and Dundalk 1*s.* per cwt.; but during the spring and summer, goods are carried from either of these two towns at 9*d.* per cwt., and sometimes from Dundalk at 8*d.* per cwt.

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No. 4.
Inquiry into the Carrying Trade of the Towns north of Dublin.

CAVAN.
Observations on Market Returns.

I consider it necessary to annex the following observations on the Agricultural Produce Returns, which have been obtained through the Constabulary in the county Cavan.

There are two Returns, (No. 1.) from Virginia, and one has been marked duplicate, but they are distinct Returns, showing, when combined, the sales of the market. In one, the sale of oats in three years is stated to have been 73,000 cwts., and in the other 84,813 cwts—in all 157,813 cwts., or 90,179 barrels, giving an annual average of 30,000 barrels, under which the annual sale cannot be, as the oats bought for mills, at Navan alone, make two-thirds of this quantity.

Arvagh.

The Arvagh Return of sales does not include oats, but the Return of traffic shows that the annual sale of oats amounts to 7,600 cwts., or 4,343 barrels.

Arvagh is on the borders next the county Longford, and the property of the Earl of Gosford. The green crop system of husbandry has been introduced here, and has been eminently successful. Notices are at present posted in Cavan, in which the premiums offered by Lord Gosford to the Arvagh tenantry, for the crops of 1837, are particularised.

Killysandra and Belturbet.

The Returns for Killysandra and Belturbet, appear to have been very carefully prepared.

It will be observed that all the grain of Belturbet market (*vide* Return, No. 2,) is consumed in the local trade.

There is not a Return, No. 2, for Killysandra; but it may be assumed that the grain of that market is also consumed in the local trade, or nearly so, there being a large mill at Ballyconnell, in the vicinity, and a large distillery in Belturbet, also close to it.

Cootebill.

The Return, No. 2, for Cootehill, shows the total traffic in grain for three years; and of the whole quantity sold only 19,000 cwts. were removed in a raw state to export markets. There are two Returns, No. 1, from Cootehill, but the one containing the lesser quantity of oats, appears as if made by one dealer. If the quantity of oats specified in it be added to the other, the total sale in three years would appear to have been 1,285,974 cwts.; while the account, No. 2, which distributes the total quantity sold in the period, makes it only 1,261,474 cwts.

ingscourt. Shircock, and Bailieborough.

From the south-east of Cavan, corn is carried by the farmers to Carrickmacross, where there is a distillery, and also a brewery. The sales in the local markets are chiefly to millers.

If returns be obtained from the mills and distilleries supplied by the county Cavan, it will be found that a greater quantity of corn is consumed by them than has been sold in all the markets combined, notwithstanding that much may have been removed, in a raw state, from these markets for exportation, or for distant districts; because large quantities are bought at each of the mills and distilleries, which are not included in the market returns.

15th February, 1837.

NEWRY, COUNTIES OF DOWN AND ARMAGH.

NEWRY.

Agricultural Produce.

Wheat, Barley, Oats, Meal, &c.

THE wheat and oats sent into Newry are principally the produce of Armagh and Down: the supplies of prime oats are from the neighbourhood of Baubridge, in the latter county.

Barley, in largest quantity, and of the best quality, is from the barony of Mourne, on the coast, north-east of Newry.

The return of the whole quantity of corn sold in the town, in 1833, 1834, and 1835, which has been furnished to the Commission, is founded on accounts obtained from the merchants; but however accurately it shows the amount of the sales, no indication of the extent of the carrying trade in corn from other towns is furnished by it; that can only be known at the market towns whence the supplies are derived.

Meal and flour are sent in for exportation, by millers in the counties of Down, Armagh, Monaghan, and Tyrone.

The great supplies of cattle, sheep, and pigs, are brought in from Armagh, Monaghan, and Tyrone.

Butter.

Butter is carried to the town from all the markets westward of it, as far as Enniskillen, and some of these are supplied from the county Leitrim; but the heavy supplies are from Armagh, Tyrone, Monaghan, and Down. The highest priced butter is from Armagh and Down; however, the supplies from these counties do not make a fourth of the whole quantity.

In May, 1826, an account was presented to the House of Commons, showing the quantity of butter sent out of each port in Ireland, from 1807, to the close of 1824, when the registry of exports to Great Britain ceased. By this it appears, that the exportation of butter from Newry exceeded in the period that of any other northern port, even Belfast. The following totals are from this account:—

1807,	23,157 cwts.	1816,	50,393 cwts.
1808,	23,509 ,,	1817,	31,501 ,,
1809,	27,919 ,,	1818,	32,747 ,,
1810,	41,280 ,,	1819,	59,945 ,,
1811,	47,766 ,,	1820,	58,922 ,,
1812,	46,929 ,,	1821,	51,589 ,,
1813,	52,183 ,,	1822,	57,529 ,,
1814,	48,023 ,,	1823,	41,788 ,,
1815,	44,484 ,,	1824,	58,590 ,,

The account states these to be exports from Newry and Strangford, but the latter is only included as a port within the Customs district of Newry.

The yearly exports now exceed 100,000 firkins, which, at 1½ to the cwt., would be 66,700 cwts. In the return made to the Commission, the butter sold in Newry is set down as exceeding 1,800,000 cwts., which is more than three times greater than the whole quantity ever exported in one year from all Ireland, before 1825. The figures are not correct, either as to cwts. or lbs., being excessive for the former, and insufficient for the latter.

Flax.

Flax, for exportation, is sent in from the markets of Armagh and Tanderagee, principally; but the quantity is decreasing annually, and must become still less as home consumption shall be again enlarged by the extension of the yarn trade through the spinning mills.

Merchandize.

The inland carrying trade from Newry is very extensive, particularly in timber, slates, iron, metal implements, salt, coal, and flax seed.

The inland carrying trade to the town, is nearly limited to agricultural produce.

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Inquiry into the Carrying Trade of the Towns north of Dublin.

NEWRY.

Merchandize.

The sugar and tea sold in the town are almost exclusively imported; as also the woollen goods, hardware, British earthenware, cured herrings, &c., &c. Small parcels of various kinds of merchandize are obtained from Belfast and Dublin; and about two-thirds of the under-leather sold in the town are also from Dublin. Supplies of sack cloth are obtained by land, from Navan and Drogheda; and when the demand for flaxseed is not met by the imports, a supply is purchased in Belfast, but the quantity is never very large.

Coals in Newry, are not so cheap as in Dundalk. Wigan coals sell usually for about £1 per ton; the ordinary house coals at 16s.; and the distillers' coals about 14s.; but turf fuel is much cheaper than in that town: a cart-load of turf, of good quality, weighing 8 or 9 cwt., is sold at 2s. to 3s. 6d., according to the seasons.

The coals of Tyrone are not used here, although the Newry canal is connected with the colliery.

The trade from Newry to the interior would be largely increased, by the formation of more level roads. The communication with Keady, Monaghan, Castleblayney, &c., is by a mountain road; and hence commodities required in the districts near those towns, which, in the natural course of trade, would be bought in Newry, are now procured from other ports. However, in this important concern, the interests of the town depend on the Grand Juries of the county Armagh, in whom the power of forming another road is vested.

There are two steam vessels belonging to the port, the property of a local company; one of 154 tons register, and the other of 112 tons; and Liverpool steam vessels are employed as the trade requires: in summer, several of the latter are actively engaged.

Manufactures.

There is a linen market on every Thursday, for the weavers in the neighbourhood, who are still carrying on the old system of manufacturing linen, working on their own account, and selling their webs at market. This trade is greatly diminished; still the manufacturing of linen is carried on now as extensively as ever, but principally by manufacturers, who supply the weavers with yarn, and pay them for weaving it into webs.

There are two large mills for spinning flax, near Newry; Mr. William Hudson's, of Mountcaulfield, and Mr. Joseph Nicholson's, of Bessbrook, the latter established twenty-five years (the first in Ireland), and the former in 1827. The yarn, however, is all used in the district; it is only the linen that creates a carrying trade.

There is a cotton mill near Newry, Mr. Atkinson's, of Gleuane, for which the cotton wool imported into Newry is purchased. Mr. Atkinson carries on the whole process of manufacturing; spinning, dyeing, bleaching, weaving, and finishing; and his webs are distributed in several directions.

Only one distillery exists in Newry; and the whiskey of it is consumed in the town or within 10 miles.

There are breweries, the produce of which is also for local consumption.

The leather made in the town is not sufficient for the local trade: a large quantity of under-leather is got from Dublin, by land—the hides of the district not yielding leather of sufficient strength and thickness.

About one half the quantity of salt required for the general trade, is imported from Liverpool. There are two manufactories in the town.

Tobacco and soap, made in the town, enter largely into the carrying trade from it.

Travelling.

Between Newry and Dublin a coach plies up and down, on alternate days, excepting Sundays, which carries ten passengers. There is a car daily to Dublin. Three coaches, running between Belfast and Dublin daily, pass through; two in the day time, and one at night. One coach, between Dublin and Armagh, passes through. There are two cars plying daily between the town and Dundalk; a coach between the town and Dungannon, county Tyrone; and a mail car to Downpatrick at night.

There is a car daily to Monaghan and Castleblayney, having a branch from the latter to Ballybay. This car leaves every evening, and arrives again next morning. There were two cars on the route, but the travelling on the line can now only support one.

There is a car to Armagh every morning, which returns in the evening; but it is not doing much business: it is interfered with by the Armagh and Dublin coach, passing through Newry, and the Dungannon coach from the town, which passes through Armagh.

There is also a day car between Newry and Banbridge, on the Belfast road.

All these cars are on four wheels, and carry 14 or 16 passengers; and there are several two-wheel cars in the town, which are used for travelling in all directions from it.

The natural money and bill trade of the town is so completely localized as not to occasion any travelling to Belfast or Dublin; there being in the town a branch of the Bank of Ireland, another of the National Bank, and an agency for a Belfast Banking Company.

24th January, 1837.

BELFAST, COUNTIES OF ANTRIM AND DOWN.

BELFAST.

Agricultural Produce.

Wheat, Oats, Barley, Flour, &c.

The corn carried to Belfast is the produce of districts within thirty miles of it. The great supply is brought in by farmers, in small loads of less than a ton weight.

I have been allowed to inspect the daily accounts of wheat bought for one of the principal mills, during January, 1836 (an active period of business), and it there appears, that quantities varying from 15 to 20 tons, were purchased daily, from about twenty farmers: the average quantity delivered by each was therefore 18 cwts. The largest quantity bought in a day, 476 cwts., was purchased from thirty-five farmers; and each, therefore, delivered about 14 cwts. The total purchases of wheat for this mill, amounted to 400 tons monthly, upon an average of the whole year; and this was nearly all bought from farmers, either at the mill or at the stores in Belfast.

The supplies of corn carried to Belfast by market dealers, are most largely purchased in Randalstown, north of Lough Neagh, an extensively supplied market; the wheat and oats purchased in which are chiefly for Belfast and two local mills. The local mills consume the greater part of the whe produced in the adjoining district of Killead, remarkable for superior corn.

Lisburn market also contributes to the supply of Belfast, through market dealers; but the local consumption there is very considerable.

Superior corn, particularly wheat, is sent to Belfast by sea, from the barony of Lecale, county

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BELFAST.
Agricultural Produce.

Down. It is shipped at Killough, Ardglass, Strangford, and the port of Downpatrick, a branch of Lough Strangford.

The principal mills from which Belfast obtains flour and meal, are in and near Belfast, and at Larne, on the coast; Antrim, north of Lough Neagh; Crumlin, east of Lough Neagh; Lisburn, eight statute miles south of Belfast; Cumber, north of Lough Strangford; Bangor, on the south coast of Belfast Lough.

At all these mills corn is bought, in addition to the supplies bought in various local markets.

In consequence of the great consumption of corn in Belfast, the prices are so high as to preclude extensive exportation from it. Frequently, the demand is so great, that wheat and flour can be bought in London, and resold in Belfast, at a profit. Even in 1835–6, low as prices were then in Ireland, this could have been done.

Large quantities of coarse flour are sent from Belfast to Ballymena, thirty statute miles north-west of it, where the consumption of flour by the manufacturing population in the district is so great that the local supplies are insufficient.

More than this general information, I have not been able to obtain. It is impossible to procure an account of the quantity of corn and flour brought to Belfast; as the sales are made at the buyers' stores, principally; and to ascertain their amount, application should be made to each mill-owner, distiller, brewer, maltster, and horse-owner, and also to each of the petty dealers: if accounts could be obtained from all these persons, it is probable the totals would be excessive, as few would be disposed to give more than an average amount of their dealings, which, doubtless, would tend to show an extensive trade.

Mr. Giveen, the Commanding Officer of Police in Belfast and the adjoining districts, has made great exertions to obtain for the Railway Commission returns of the agricultural produce sold in Belfast and neighbouring towns. He has not been able to obtain returns for Belfast; and he states, that the returns for the other towns, which he has forwarded to the Commission, cannot be relied on:—the purchasers of a large portion of the produce sold there, live in other places, and cannot be traced; and, he apprehends, that the estimates of local traders, on which the returns are founded, have been framed to show an extensive trade carried on by themselves.

Butter.

The butter exported from Belfast, is the produce of the northern districts of Down and Armagh, and the southern districts of Antrim and Tyrone. The exportation of butter from this town is not increasing, owing to the great extent of this trade in Newry, and the opening of an export trade from Portrush, on the north coast of Antrim, which draws off much of the butter that would otherwise be shipped at Belfast.

To supply the want of information as to the precise extent of the exportation of butter from Belfast, at present, I have extracted the following totals of its exports of the eighteen years preceding 1825, from an account presented to the House of Commons, on the 4th May, 1826; and I refer to my previous statement, founded on good authority—"The exportation of butter from this town is not increasing."

1807, - -	14,464 cwts.	1816, - -	47,303 cwts.
1808, - -	19,414 "	1817, - -	34,532 "
1809, - -	19,695 "	1818, - -	28,010 "
1810, - -	30,684 "	1819, - -	42,178 "
1811, - -	30,708 "	1820, - -	52,156 "
1812, - -	39,590 "	1821, - -	39,079 "
1813, - -	37,269 "	1822, - -	25,567 "
1814, - -	41,686 "	1823, - -	29,241 "
1815, - -	42,489 "	1824, - -	41,451 "

If the present exportation be equal to an average of the exports in the five years ending with 1824, it would amount to 1,875 tons.

Pork.

Very great quantities of pork are carried to Belfast, for the merchants in the provision trade, from various markets in Antrim, Down, Armagh, Monaghan, Tyrone, and Londonderry. The pigs are slaughtered at the interior markets, and thence conveyed to Belfast by market dealers, who sell them at the stores of the merchants. A single dealer frequently brings, at once, ten of the long country carts with a full load (nearly a ton) on each.

The supplies of superior pork are sent into Belfast by farmers in Antrim and Down.

Pigs are brought in alive for exportation.

The provision trade in beef is decreasing. The pork trade is increasing. The exports of pork are chiefly to Liverpool and London.

Flax.

Flax is carried to Belfast by dealers, and large quantities are sent in by persons who buy it on commission. The largest supplies are from the markets of Armagh, Tanderagee, Monaghan, Ballybay, and Cootchill.

Foreign flax is also used in Belfast; but this is not occasioned by a deficiency in the home supply; it is to make the finest yarns, for which the Irish flax is unfit.

There is, annually, a very large exportation of Irish flax from Belfast.

Merchandize.

Belfast is the mercantile capital for a large portion of Ulster; but it is only in the towns supplied from it, that the extent of the carrying trade, occasioned by its imports, can be known.

Among the heavy commodities, large quantities of coals are conveyed a great way into the interior; but this carrying trade, on the principal line, that is, towards Armagh, Monaghan, &c., devolves chiefly to the Lagan navigation. The Dungannon distillery is supplied with coal from Belfast, by that navigation: it was formerly supplied from the colliery in its neighbourhood. The prices of coals, when there is a full supply, are 12*s.* a ton for Scotch, and about 13*s.* for English coals in ordinary use.

The quantity of flax seed carried to the interior, is very great. In 1836, it amounted to 13,654 hogsheads, each containing seven bushels.

The wholesale woollen and silk trade is extensive in Belfast, which furnishes supplies to retailers in towns within forty miles of it. Traders in these towns also supply themselves from English establishments, and get the bales through Belfast.

Manufactures.

There are in Belfast and its suburbs fifteen mills for the spinning of linen yarn, and there are four at places near it,—viz., one at Carrickfergus, one at Larne, one at Ballyclare, and one at Castlewellan.

Appendix
No. 4.
Inquiry into the Carrying Trade of the Towns north of Dublin.

BELFAST.
Manufactures.

Linen Yarn.

The largest of these mills, that of S. K. Mulholland, Hind, & Co., in Belfast, employs eight hundred persons, who receive in wages about £200 weekly. Its works are impelled by two engines, each of fifty horse power, and it consumes about 90 tons of coal, weekly, including Kendal, used in the gas works, constructed within the establishment for lighting it. Its annual consumption of flax amounts to 720 tons, 200 of which are imported from Holland, Belgium, and France. The linen and tow yarn obtained from these 720 tons of flax, extends to three million hanks, each of 3,600 yards; in value, £80,000; and about a twentieth part of this quantity, is exported.

Very large supplies of hand-spun yarn are obtained from Longford and Roscommon, through Dublin, by sea. Large supplies are received by land, from Monaghan and Armagh, collected there by yarn dealers. The hand-spun yarn sold on commission, in the Linen Hall of Belfast, produces, on average, annually, a total somewhat under £100,000.

Linen.

Linen is sent to the Belfast factors, on commission, from the several counties in the north of Ireland, and from Roscommon, Leitrim, Sligo, and Mayo; also from King's County (but there the trade has fallen off), and from Longford. King's County and Longford Linen is conveyed to Belfast, either directly, or through Dublin, and thence by sea. Mayo linen is sent through Dublin; Sligo linen is received directly, on carts.

The largest supply obtained from any of the linen markets, is bought by Belfast merchants in Ballymena, where the linen trade is still conducted on the old system, more extensively than in any other part of Ireland. The brown linen sold there in 1821, was valued at £83,813; in 1822, £48,961; in 1823, £93,981; and in 1824, £73,610. The value of the linen now sold there, annually, considerably exceeds the average of these four totals.

In all other parts of Ireland, the old market trade, every weaver in which was manufacturing on his own account, has fallen off; but the most experienced persons concerned in the trade at Belfast, state, that the manufacturing of linen throughout Ulster, has increased in the last five years.

A large quantity of linen is exported from Belfast to foreign countries; but the greater part is sent through Liverpool, as the direct foreign trade of Belfast is not sufficient to maintain that general and continuous intercourse which is essential to the successful exportation of manufactures. Large shipments of linen are therefore made in England, for account of Irish manufacturers and merchants.

To indicate the direction of the carrying trade in Ireland, occasioned by linen and yarn, I shall introduce here the totals of the value of unbleached linen, sold by weavers, in the respective counties, during the years 1821, 1822, 1823, and 1824, as furnished by the returns of the seal officers, and inspectors of the late Linen Board, presented to Parliament upon the 22nd of June, 1825.

	1821.	1822.	1823.	1824.
Antrim, - - - - -	£345,504	£332,496	£351,912	£323,767
Armagh, - - - - -	570,348	608,842	537,341	568,799
Down, - - - - -	214,199	204,828	197,943	288,514
Tyrone, - - - - -	388,809	397,657	381,090	434,898
Londonderry, - - - -	231,219	286,810	225,496	252,614
Donegal, - - - - -	33,076	38 954	35,966	20,432
Fermanagh, - - - -	23,386	24,027	16,535	21,259
Monaghan, - - - -	142,952	134,485	112,330	125,959
Cavan, - - - - -	116,626	99,429	89,564	123,063
TOTAL, ULSTER, - -	£2,066,119	£2,127,528	£1,968,177	£2,109,305
Meath, - - - - -	£900	£1,000	£2,710	£1.415
Louth, - - - - -	212,062	235,235	143,169*	130,908*
Longford, - - - - -	43,269	67,978	37,554	34,941
Westmeath, - - - -	3,683	3 361	3,858	4,334
King's County, - - - -	22,161	25,771	19,095	19,918
Kildare, - - - - -	1,125	1,325	1,250	1,369
Kilkenny, - - - - -	1,345	1,403	No Returns.	No Returns.
Wexford, - - - - -	807	622	do.	do.
TOTAL, LEINSTER, -	£285,352	£336,695	£207,636	£192,885
Waterford, - - - -	£27	£472	No Returns.	No Returns.
Cork, - - - - -	49,183	64,095	76,045	87,380
Kerry, - - - - -	13,019	10.278	10,965	11,026
Limerick, - - - - -	5,627	6,419	7,568	10,858
Clare, - - - - -	18	No Returns.	No Returns.	238
Tipperary, - - - -	994	936	616	918
TOTAL, MUNSTER, -	£68,868	£82,200	£95,194	£110,420
Galway, - - - - -	£8.421	£15,364	£13,304	£18,275
Mayo, - - - - -	71,526	82,401	89,181	111,896
Sligo, - - - - -	26.785	24,317	25,570	23,682
Leitrim, - - - - -	723	2,639	327	1,217
Roscommon, - - - -	10,207	5,991	12,472	13,017
TOTAL, CONNAUGHT, -	£117,662	£130,912	£140,854	£168,087
TOTAL, IRELAND, - -	£2,538,001	£2,677,335	£2,411,861	£2,580,697

Damask.

There is a new damask manufactory at Belfast, established by Mr. Michael Andrews, which is said to be an improvement on the manufactory at Lisburn.

Cotton.

The cotton trade of Belfast is declining. Several of the cotton mills are now employed in spinning flax, and there are now only six cotton mills in the town, and one at Killyleigh, county Down.

However, the carrying trade is not materially affected by either the manufacture of damask or cotton at Belfast.

Paper.

There are two paper manufactories near the town, and three near Antrim, sixteen statute miles north-west of it.

Leather.

There are six tanners in the town, but they do not supply the demand for leather. Sole leather is brought from Dublin by sea, and the best kind of dressed leather is imported from England.

Hides.

About two-thirds of the hides tanned in Belfast, are imported.

Hosiery.

Only a very small portion of the hosiery manufactures sold in Belfast, are Irish. Formerly, the

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* See Report from Drogheda for the cause of this decrease.

BELFAST.

Belfast woollen merchants distributed in their trade, a large quantity of Irish woollen stockings, made principally in Donegal; but on the rise in the price of wool, the Donegal knitters commenced using a bad kind—in consequence of which, their stockings became unsound in a few months, and lost all character with the merchants.

Manufactures.

There are nine iron founderies in Belfast, which employ about 500 persons. Iron machinery, stoves, &c., are transmitted, in the ordinary trade, as far as Coleraine, on one side of Lough Neagh, and Enniskillen, on the other side. Recently, however, some iron works have been sent to Clonmel. There are eight brass founderies, which employ thirty-two persons; but the works made are nearly all for local orders.

White glass and bottles are made in two manufactories, for the supply of local establishments.

Distilleries and Breweries.

There are two distilleries and nine breweries. The whiskey made is not sufficient for the local consumption: a large quantity is brought to the town from other places. There is a considerable exportation of porter.

Salt.

The manufacture of salt has been discontinued in Belfast; and the whole supply of salt for the town, and the places supplied from it, is imported. It is stated, that the salt works here were stopped when the import duties on British manufactured salt were abolished, as the difference between the duty on rock salt and the manufactured article was considered necessary to protect the Irish works; but in Drogheda, Dundalk, and Newry, the manufacture of salt is carried on as actively as when the import duties were charged: indeed, at Drogheda, the trade has been increased.

Travelling.

A steam vessel, and three coaches, are employed between Belfast and Dublin. The travelling intercourse with towns in Ulster is so great, that I must refer to the list of coaches and caravans employed by it, which has been furnished by the Constables of Police.

30th January, 1837.

ENNISKILLEN.

ENNISKILLEN, COUNTY FERMANAGH.

Agricultural Produce.

	Quantity sold in the Market annually, on an average of 1833, -4, & -5.	Proportion sent or taken to other places for Sale or Export.	Places to which Produce is sent for Sale or Export.	Mode of Conveyance.	OBSERVATIONS.
Wheat.	19 tons.	One-third.	Londonderry.	On carts.	The cultivation of wheat in Fermanagh is not extensively carried on, but it is increasing every year. Only a small portion of the quantity at present grown is sold in the market. The principal sales are made at the mills, and these also obtain supplies from other districts. One of the millers is now getting wheat from Limerick, by sea, through Ballyshannon.
Barley.	28 tons.	None.	—	—	—
Oats.	742 tons.	One-twentieth.	Ballyshannon.	In boats to Belleek (20 miles) and thence (3 miles) on carts.	The average quantity sold in the market has been ascertained from the receiver of tolls paid for the produce sold, and he has also made the estimate of the proportion sent away. With reference to both, he has given me the following written explanation: "My means of giving these quantities are uncertain. I have calculated from the sums received each year at the market scales, where are weighed potatoes, oats, barley, wheat, and oatmeal, indiscriminately; and it is only from observation of the different articles weighed, that I can in any way judge of them. During the last five years there were scales, in opposition to the market scales, set up in another part of the town, where many of the same kind of articles were weighed; these are now put down: however, I am sure that no accurate return could be made out here, as millers, distillers, and brewers purchase with the intention of weighing in their own scales, of which the sellers avail themselves, to escape paying twopence per sack at the market scales. The estimated proportion sent away to other places is given on conjecture." If the corn weighed at the market scales were all sold in 40 weeks, (the usual duration of the season in the corn markets of Ireland,) the average weekly sale of wheat would be under four barrels; the weekly sale of barley would be under seven barrels; and the weekly sale of oats would be only 212 barrels, or 371 cwts.

Appendix B.

No. 4.
Inquiry into the Carrying Trade of the Towns north of Dublin.

ENNISKILLEN.
Agricultural Produce.

	Quantity sold in the Market annually, on an average of 1833, -4, & -5.	Proportion sent or taken to other places for Sale or Export.	Places to which Produce is sent for Sale or Export.	Mode of Conveyance.	OBSERVATIONS.
Butter.	485 tons.	450 tons.	Newry and Londonderry.	On carts.	The butter trade of Enniskillen is declining, as other markets have arisen in the county Fermanagh; Derrygonnelly, Tempo, &c. About six years ago, the whole quantity bought in Enniskillen for export was sent to Newry, in preference to Londonderry, although the distance to the former is 55 Irish miles, and to the latter only 45. Butter exported from Newry had then a very high character, owing to the reputation which the inspector of butter there (under the old system of the trade) had acquired; however, at present the greater part is sent to Londonderry; at least two-thirds of the whole quantity sent away must be taken to that place. Much of the butter is obtained from the county of Leitrim.
Eggs.	4,500 dozen.	4,000 dozen.	do.	do.	The whole quantity of eggs taken away might be carried in five of the crates in which eggs are usually brought to Dublin from Roscommon, one of which contains 10,080 eggs, or 84 hundred, of six score each.
Pigs.	—	Number. 4,500	do.	—	—
Flax.	—	14 tons.	Belfast.	On carts.	About 14 tons of flax are sent away annually. In the return of produce sold, No. 2, the flax is stated to be sent to Londonderry; but the greater part is sent to Belfast. There is a flax mill at Lisbellaw, near Enniskillen.
Wool.	—	—	—	—	The wool of Fermanagh is not sent to Enniskillen market. In Cavan, a large quantity of Fermanagh wool is bought for Dublin market.
Sheep and Lambs.	—	Number. 4,500	Omagh, Londonderry, and Newry.	—	—

Merchandize.

Three of the principal traders in Enniskillen having been absent from the town while I remained, I was unable to obtain specific information as to the quantities of several kinds of merchandize brought to the town. The trade in the very heavy commodities, as timber, iron, coal, &c., is carried on by two of these merchants, one of whom has also a mercantile house in Sligo.

Supplies of meal and flour are usually from Ballycassidy and Lisaniskea, county Fermanagh; Ballyhaise, county Cavan; Cockstown, near Ballyshannon, county Donegal; Caledon, county Tyrone; Glasslough, county Monaghan; Slane, county Meath.

The traders, however, who sell flour, obtain supplies from every quarter to which the carriers of the town have business, when the prices afford a prospect of profit. The annual consumption by bakers amounts to 8,760 cwts. I could not ascertain the extent of the general sale.

The whole supply of oatmeal is obtained from neighbouring mills.

Sugar is obtained through Londonderry and Sligo.

Tea through Dublin, principally; part through Londonderry.

Wine from Dublin.

About 500 puncheons of whiskey are consumed annually; and purchased in Belturbet, Ballyshannon, and Londonderry; also in Enniskillen.

Tobacco is obtained from Belfast, principally; also from Londonderry, Lurgan, (county Armagh,) and Cavan.

Soap is procured from Donamore, near Dungannon, and from Clones, in the county Monaghan.

Mould candles are supplied from Dublin; the common candles from Dublin, Newry, Belfast, Londonderry, Strabane, and Maguires-bridge.

Starch is carried from Dublin: about 15 tons annually.

It is computed that the annual sale of flax seed extends to 150 tons. The greater part is obtained from Londonderry; some from Belfast and Newry; some has been obtained from Sligo, but not latterly.

Leather is supplied from Dublin and Ballyshannon. There is one manufactory in Enniskillen.

Salt is brought from Ballyshannon and Sligo.

Timber is imported through Ballyshannon.

Iron and metals are imported through Ballyshannon and Newry; and hardware through Londonderry and Newry. There is a manufactory of spades and shovels at Lisbellaw, near Enniskillen, from which, and another at Coal Island, county Tyrone, supplies are obtained. There is also one near the town of Donegal.

Coals, Lead, Tin, Slates, Firebricks, and Earthenware, are imported through Ballyshannon and Sligo. Coals are principally from Wigan, and are usually sold for 36*s.* per ton.

The traders in woollens, cottons, &c., purchase their supplies in Leeds and Manchester, and receive them through Londonderry. The supply from Dublin is trivial, excepting printed calicoes and muslins, a large portion of which is purchased there. No other apparel is obtained from it in large quantities for Enniskillen.

ENNISKILLEN.

Manufactures.

Linen Trade.

THERE is a linen market held in Enniskillen, once in a fortnight, but the quantity of linen sold is less now than in former years, when every weaver was the owner of the webs he made.

Enniskillen has always been the only largely supplied linen market in the county, which appears by the accounts of the late Linen Board, showing the value of the unbleached linen sold in each market.

Years.	Value of unbleached Linen, annually sold in Enniskillen.	Value of unbleached Linen, sold in the county Fermanagh.
1821,	£20,732	£23,386
1822,	20,007	24,027
1823,	14,172	16,535
1824,	20,634	21,259

The county Fermanagh had less of the old linen trade than any county in Ulster. Donegal had more of it. The county of Cavan was next in advance of Donegal. Monaghan, again, had more of the trade than Cavan.

The number of pieces of linen sold at present in Enniskillen, is from 200 to 300, of 25 yards each, every fortnight; and, taking a medium number, the total, in the year, is only 6,500. They are sent, in the first instance, from the market to various bleach greens, and thence consigned to Londonderry and Belfast, for exportation.

Carrying Trade, and Travelling.

Merchandize is carried between Enniskillen and Londonderry, 45 Irish miles, for 1*s.* to 2*s.* per cwt.; between it and Newry (10 Irish miles farther), for 1*s.* 6*d.* to 2*s.* 6*d.*; the charge, in both cases, varying according to the season; and between it and Dublin, 80 Irish miles, for 3*s.* to 3*s.* 6*d.* per cwt. The charge for carrying to Belfast, 73 Irish miles, is 3*s.* 6*d.* per cwt.

There are two coaches plying daily between Enniskillen and Dublin; one carrying the Post Office mails and eight passengers; the other carrying sixteen passengers. There is a coach between it and Ballyshannon, which takes passengers to and from the mail coach, gratuitously. There is also a coach to Londonderry. There is another to Belfast.

The extent of employment for coaches between the town and Dublin, may be best estimated by the fact, that for £1 5*s.*, an inside seat is obtained in the mail coaches, from Dublin to Ballyshannon, a distance of 130 statute miles.

16th February, 1837.

CLONES.

Agricultural Produce.

CLONES, COUNTY MONAGHAN.

	Quantity sold annually, in the Market, on an average of 1833, 4, & 5.	Quantity sent or taken away for Sale or Export.	Places to which the Produce is usually sent, or taken, for Sale or Export.	Mode of Conveyance.	OBSERVATIONS.
	Cwts.	Cwts.			
Wheat.	25,800	14,800	Dundalk and Newry.	On carts.	The grain sold in Clones is generally of superior quality. Several large mills are supplied with it, also a local brewery. The estimate of the sales, and of the quantity sent or taken away for sale in other towns, or exportation, has been made by the weighmaster of the town.
Barley and Rye.	44,360	38,300	do.	do.	
Oats.	38,900	25,900	do.	do.	
Flax.	2,700	2,600	Dundalk, Newry, Armagh, and Belfast.	do.	
Butter.	2,500	1,900	Dundalk, Newry, and Belfast.	do.	
Eggs.	1,500	1,150	do.	do.	
	Number.	Number.			
Sheep and Lambs.	3,600	2,900	do.	do.	
Pigs.	32,700	31,200	do.	do.	
Hides.	—	—	Cootehill, principally.	do.	There is not any tanning carried on at Clones, although an establishment for the purpose was fitted up some years ago.

Appendix B.

No. 4.
Inquiry into the Carrying Trade of the Towns north of Dublin.

CLONES.
Manufactures.

The annual sale of linen, in the market of Clones, is estimated to extend to 5000 pieces, of 25 yards each. It was much greater before 1826. The following totals of the value of unbleached linen, sold, annually, in Clones, and in the whole county of Monaghan, during the years 1821, 1822, 1823, and 1824, are given in the Reports of the late Linen Board.

Years.	Clones.	County Monaghan.
1821,	£15,943	£142,952
1822,	16,915	134,485
1823,	12,170	112,330
1824,	18,192	125,959

The linen sold in Clones is bought for the Armagh and Down bleaching establishments.

Merchandize.

	Average Sale, annually.	Places through, or from which, Supplies are obtained.	OBSERVATIONS.
Flour,	—	The neighbouring mills, and Dundalk.	—
Sugar.	Cwts. 900	Belfast.	—
Do. refined.	40	do.	—
Tea.	56	do.	—
Wine.	Pipes. 2	Dublin.	
Beer.	—	The town brewery, and Monaghan.	Clones brewery has a demand from Monaghan, and the brewery in Monaghan has a demand from Clones.
Spirits.	Puncheons. 140	Dundalk, Monaghan, Dungannon, and Belturbet.	
Salt.	—	Dundalk.	There is an extensive sale of salt in the open market; and all the petty dealers get supplies directly from the towns in which there are salt works. The quantity sold cannot, therefore, be easily estimated.—(See Estimate of sale in Cavan). The greater part of the whole quantity sold is obtained from Dundalk.
Tobacco.	Cwts. 104	Cavan.	
Leather.	104 —	Cootehill, Monaghan, Armagh, Newry, and Dublin.	
Tallow.	400	Newry and Belfast.	
Barilla, Ashes, & Kelp.	200	Belfast.	
Starch.	100	Dublin.	
Coals.	1,600	Dundalk.	The coals used for domestic consumption are from Wigan, and are usually sold in the town for £1 12*s.* 6*d.* per ton: at present, they are sold for £2 2*s.* per ton.
Timber, (plank.)	3,000	Newry and Dundalk.	
Iron and Metals.	1,200	Newry and Dundalk.	The greater part of the iron and metals is obtained through Newry.
Hardware.	100	Dundalk.	There is a manufactory of spades and shovels, with other implements, at Stonebridge, near Clones.
Slates.	—	Dundalk and Newry.	The demand being uncertain, the quantity of slates carried, annually, cannot be accurately estimated.
Drapery and Apparel.	—	Dublin principally.	

Carrying Trade, and Travelling.

The charge for carrying merchandise to Clones, from Dundalk (28 miles, Irish), is 10*d.* per cwt.; and from Belfast (60 Irish miles), 2*s.* 4*d.* per cwt. The charge for carrying from Dublin, is from 2*s.* 6*d.* to 3*s.* per cwt.; the distance is 68 Irish miles.

It is calculated that eleven carts are employed weekly, in travelling between Clones and Dublin; eight, weekly, between it and Belfast; and one hundred and thirty, weekly, between it, Dundalk, and Newry.

There is one coach plying between Clones and Dublin, which is also for Cootehill and Kingscourt, passing to and fro on alternate days.

18th February, 1837.

Appendix B.

No. 4.
Inquiry into the Carrying Trade of the Towns north of Dublin.

MONAGHAN.
Agricultural Produce.

MONAGHAN.

THE market of this town is largely supplied with wheat, barley, and rye, oats, butter, flax, and pigs; and is remarkable for the quantity of pork transmitted from it to the Belfast curing houses.

On my arrival, I was apprised of the severe illness of a Commissariat contractor, resident in the town, who is also a commission buyer of agricultural produce for exportation, from whom I had expected to ascertain the extent of the carrying trade of the town, in oats, butter, and other commodities. To-day, he saw me, in his room, but was still incapable of making the calculations I required; however, he promised, on recovering, to furnish them on a form for the purpose, which I prepared.

I read for him the totals specified in the returns of agricultural produce sold in 1833, 1834, and 1835, which have been obtained by the police constables; and he considers some of them to be considerably under the sales of the market.

If the whole quantity of corn specified in those returns, were sold in forty weeks, the weekly supplies would be; wheat, 290 barrels, or 36 tons; barley and rye, 433 barrels, or 43 tons; oats, 1,836 barrels, or 162 tons.

If the whole of the butter specified in the returns, were sold in twenty weeks, the weekly supply would be, 115 cwts., or $5\frac{3}{4}$ tons.

If the whole of the pork specified, were sold in twenty-five weeks, the weekly supply would be, 216 cwts., or, $10\frac{3}{4}$ tons.

On yesterday, the weekly market was held; and when I walked through the pork market, there were 25 carts in it, with full loads, which was considered a very small supply, much under an average one: the market was stated to be the worst in the season: yet, if only 25 loads, of 16 cwt. each, were made up in each market, for twenty-five weeks, the total quantity would be 10,000 cwts.; but, according to the returns, the total sales, in 1835, amounted only to 5,400 cwts., or 270 tons.

As the illness of the trader referred to, and the absence of another, render it impossible for me to ascertain the actual extent of the carrying trade from the town, and having this day received a letter from the Secretary of the Railway Commission, signifying the Commissioners' approval of my returning to Dublin, as I had suggested, to await the result of written applications to traders, for returns of the traffic to and from the principal towns of the interior, I have not proceeded further in my inquiries into the trade of this town.

Carrying and Travelling.

The following are the charges made for carrying loads between Monaghan, the principal ports near it, and Dublin:

To or from Belfast, 1*s.* 6*d.* per cwt.—Distance, 45 Irish miles.
" Newry, 1*s.* do. " 26 "
" Dundalk, 6*d.* do. " 23 "
" Dublin, 3*s.* do. " 62 "

There is not a coach from this town to Dublin, but the Londonderry mail passes through every evening, at half-past nine o'clock; and a day coach from Omagh passes on three days in the week. A second coach from Omagh to Dublin, by Ballybay, has been recently withdrawn.

Monaghan, 21st February, 1837.

(Signed) W. STANLEY.

APPENDIX B.

No. 5.

RETURN OF PUBLIC CONVEYANCES

FOR PASSENGERS,

BETWEEN THE SEVERAL TOWNS IN IRELAND.

NOTE.—The Places named on the left side of the first Column are all situated in the Counties named at the head of each Table.

COUNTY OF ANTRIM.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction	Number of Passengers each can carry.	Average Number carried.	Fare per Mile. Inside.	Fare per Mile. Outside.	Distance in Irish Miles between Places in first Column
						d.	d.	
Ballycastle—Coleraine	Dervock	2 Caravans(a)	1	16	12	–	0¾	16
,, Cushendall	~~~~	Mail Car	7	4	3	–	1	10
Ballymena—Ballymoney	Clough and Cloughmills	Car	6	6	4	–	1½	15
,, Coleraine	Ballymoney and Dunboy	Car	6	4	2	–	1½	22
,, Portglenone	Ahoghill	Car	1	6	4	–	1¼	7
Ballymoney—Ballycastle	Dervock	Mail Car	7	4	2	–	1¼	12
Belfast—Ahoghill	Antrim, Randalstown	Car	1	6	5	–	1¼	23
,, Antrim	~~~~	2 Caravans	3	12	11	–	1¾	13
,, Antrim	~~~~	3 Cars	3	6	4	–	1½	13
,, Armagh	Lisburn, Moira, Lurgan, Portadown	2 Coaches	6	16	12	2½	1½	31
,, Ballyclare	~~~~	Caravan	2	12	8	–	1¼	11
,, Ballyclare	~~~~	2 Cars	2	6	4	–	1	11
,, Ballymena	Antrim, Kells	Coach	6	16	10	2½	1½	22
,, Ballymena	Antrim, Kells	Car	6	6	4	–	1½	22
,, Ballynahinch	Newton-Breda, Saintfield	Coach	3	16	13	2¼	1¼	13
,, Ballynahinch	Newton-Breda, Saintfield	Car	2	6	4	–	1	13
,, Banbridge	Lisburn, Hillsborough, Dromore	Coach	6	16	14	2	1½	20
,, Banbridge	Lisburn, Hillsborough, Dromore	Car	3	8	6	–	1½	20
,, Bangor	Hollywood	Mail Car	7	6	4	–	1½	10
,, Carrickfergus	~~~~	2 Caravans	6	14	10	3	1½	8
,, Carrickfergus	~~~~	10 Cars	7	6	4	–	1	8
,, Castlewellan	Ballynahinch	Caravan	2	10	8	2	–	22
,, Coleraine	Antrim, Kells, Ballymena, Clough, Cloughmills, Ballymoney	Coach	3	16	9	4	2	44
,, Comber	~~~~	2 Caravans	6	12	10	1	–	7
,, Cookstown	Antrim, Randalstown, Toome, Castledawson, Magherafelt, Moneymore	Coach	6	16	11	2½	2	37
,, Crossgar	Saintfield	Car	2	6	4	–	1¾	13
,, Donaghadee	Hollywood, Bangor	Coach	6	16	10	2	1	15
,, Donaghadee	Newtown-Ards	Mail Car	7	6	3	–	1½	16
,, Downpatrick	Saintfield, Crossgar	Coach	3	16	11	3½	2	18
,, Downpatrick	Saintfield, Crossgar	Caravan	3	12	7	1½	–	18
,, Downpatrick	Comber, Killinchy, Killyleagh	Mail Car	7	6	3	–	2	21
,, Downpatrick	~~~~	Car	1	6	3	–	1½	21
,, Dublin	Newry, Dundalk, Drogheda	Mail Coach	7	8	6	4¾	2½	80
,, Dublin	Newry, Dundalk, Drogheda	Day Mail C.	7	16	11	3¼	1½	80
,, Dublin	Newry, Dundalk, Drogheda, Balbriggan, Swords	Coach	7	16	11	3	2½	80
,, Dungannon	Lisburn, Moira, Lurgan, Portadown, Moy	Coach	3	16	10	2¼	1¾	36
,, Enniskillen	Lisburn, Moira, Lurgan, Portadown, Armagh, Monaghan, Lisnaskea, Clones	Mail Coach	7	8	4	4½	2½	76
,, Grey Abbey	Newtown-Ards	Car (b)	5	6	3	–	1½	14
,, Hollywood	~~~~	Cars	7	6	5	–	1½	4
,, Kilrea	Antrim	Car	3	6	4	–	1½	32
,, Larne	Carrickfergus, Ballycorry	Coach	6	16	10	2½	1½	18
,, Larne	Carrickfergus, Ballycorry	Coach	7	16	10	2½	1½	18
,, Lisburn	~~~~	Coach	6	16	12	3	2	7
,, Lisburn	~~~~	Caravan	6	16	12	1	–	7
,, Lisburn	~~~~	Caravan	2	8	6	1	–	7
,, Lisburn	~~~~	39 Cars	6	6	5	–	1	7
,, Londonderry	Antrim, Ballymena, Ballymoney, Coleraine, Newtown-Limavady	Mail Coach	7	8	4	5¼	3¾	71
,, Lurgan	Lisburn, Moira	Caravan	6	14	12	2¼	1¼	17
,, Magherafelt	Antrim, Randalstown, Toome, Castledawson	Caravan	3	12	9	2¾	1¾	27
,, Newtown-Ards	~~~~	3 Caravans	6	14	6	1½	–	8
,, Newtown-Ards	~~~~	Caravan	3	14	6	1¼	–	8
,, Newtown-Ards	~~~~	Car	6	6	4	–	1½	8
,, Newtown-Ards	~~~~	Car	1	6	4	–	1½	8
,, Portadown	Lisburn, Moira, Lurgan,	Coach	6	16	12	2½	1½	22
,, Portaferry	N. T.-Ards, Grey Abbey, Kircubbin	Coach	6	16	11	2¼	2	22
,, Portaferry	N. T.-Ards, Grey Abbey, Kircubbin	Mail Car	7	4	3	–	1½	22
,, Portglenone	Antrim, Randalstown	Caravan	3	10	6	–	–	26
,, Randalstown	Antrim	Car	2	6	4	–	1½	17
,, Saintfield	Newton-Breda	Car	3	6	5	–	1½	9
Bushmills—Coleraine	~~~~	2 Cars	1	6	5	–	2	6¼
Dervock—Coleraine	~~~~	3 Cars (c)	1	6	5	–	1	–
Larne—Cushendall	Glenarm	Mail Car	7	6	4	–	1½	19
Portrush—Coleraine	~~~~	2 Cars (d)	12	6	4	–	1¼	6½

(a) Their opposition causes the low price charged. Each goes once per month from Ballycastle to Ballymoney.
(b) Proceeds to Kircubbin, if required, varying in number from 8 in the winter months to 25 in the summer.
(c) These run on Saturdays.
(d) Each Car, twice daily in one direction.

Appendix B.
No. 5.
Public Conveyances.

COUNTY OF ARMAGH.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction	Number of Passengers each can carry.	Average Number carried.	Fare per Mile.		Distance in Irish Miles between Places in first Column
						Inside.	Outside.	
						d.	d.	
Armagh—Aughnacloy	Caledon	Car	6	6	3	–	1½	13
„ Belfast	Portadown, Lurgan, Moira, Lisburn	2 Coaches	6	16	12	2¼	1½	31
„ Caledon	~~~~	Car	7	6	4	–	1½	7
„ Clogher	Aughnacloy, Caledon	Car	6	6	4	–	1½	20
„ Dublin	Markethill, Newry, Dundalk, Castlebellingham, Dunleer, Drogheda, Duleek, Ashbourne	Coach	6	15	10	4¾	2¾	64
„ Dublin	Markethill, Newry, Dundalk, Drogheda, Julianstown, Swords	Coach	3	15	12	3	2½	64
„ Dungannon	Charlemont, Moy	Caravan	2	10	7	1¼	–	11
„ Dungannon	Charlemont, Moy	7 Cars	1	6	4	–	1¼	11
„ Enniskillen	Five-mile-town, Clogher, Augher, Aughnacloy, Caledon	Mail Car	7	6	3	–	1½	40
„ Enniskillen	Five-mile-town, Clogher, Augher, Aughnacloy, Caledon	Car	6	6	3	–	1½	40
„ Monaghan	Glasslough, Caledon	Mail Car	7	4	2	–	2	14
„ Moy	~~~~	8 Cars	2	5	3	–	2	6
„ Stewartstown	Moy	Caravan	1	10	6	2	–	13
„ Tanderagee	~~~~	Car	3	6	4	–	1½	9
Lurgan—Belfast	Moira, Lisburn	Caravan	6	14	12	2¼	1¼	17
Lurgan—Banbridge	~~~~	Car	1	6	4	–	2	17
Newry—Armagh	Markethill	Caravan	6	16	12	1¾	–	15
„ Ballibay	Castleblaney, Newtownhamilton	Car	7	4	3	–	1½	21
„ Banbridge	Loughbrickland	Car	6	6	4	–	2	10
„ Banbridge	Loughbrickland	Car	1	6	4	–	2	10
„ Coleraine	Markethill, Armagh, Moy, Dungannon, Cookstown, Magherafelt, Garvagh	Mail Coach	7	8	3	5	3	66
„ Downpatrick	Rathfriland, Castlewellan, Clough	Mail Car	7	6	4	–	2½	24
„ Dublin	Dundalk, Drogheda, Ashbourne	Caravan	6	16	10	2¼	–	50
„ Dundalk	Flurrybridge	2 Caravans	6	16	12	2½	–	10
„ Hilltown	~~~~	3 Cars	2	6	3	–	1½	8
„ Kilkeel	Warrenpoint, Rosstrevor	Car	3	6	4	–	1½	15
„ Monaghan	Castleblaney, Newtownhamilton	Caravan	7	15	10	–	1½	26
„ Rathfriland	~~~~	Car	7	6	4	–	2	8
„ Tanderagee	Pointz-Pass	Car	3	6	4	–	1½	12
„ Warrenpoint	~~~~	50 Cars (a)	7	6	4	–	1¼	5
Portadown—Belfast	Lurgan, Moira, Lisburn	Coach	6	16	12	–	1½	22
„ Dungannon	Charlemont	Coach	3	16	6	4	2½	12
„ Tanderagee	~~~~	Car	6	6	3	–	1½	4
Tanderagee—Markethill	~~~~	Car	1	6	3	–	1½	6

COUNTY OF CARLOW.

						d.	d.	
Carlow—Athy	~~~~	Caravan	7	16	8	1½	–	10
„ Castlecomer	~~~~	Mail Car	7	4	2	–	1½	11
„ Dublin	Castledermot, Ballytore, Kilcullen, Naas, Rathcoole	Coach	6	15	12	3	1½	39
Goresbridge—Kilkenny	~~~~	Car	2	6	5	–	1	9
„ Newtownbarry	Tullow, Clonegal	Mail Car	7	4	2	–	1½	16½
N. T. Barry—Dublin	Clonegal, Tullow, Baltinglass, Blessington	Coach	3	15	7	2¾	1½	62½
„ Enniscorthy	~~~~	Car	6	6	3	–	2	10
„ New Ross	Leighlinbridge, Bagnalstown, Goresbridge, Borris-Graigue	Car	3	6	3	–	2¼	15

COUNTY OF CAVAN.

						d.	d.	
Cavan—Belturbet	Butler's-bridge	Coach (b)	6	15	6	2½	1½	7
„ Dublin	Virginia, Kells, Navan, Dunshaughlin, Clonee	Coach (c)	6	15	9	2¾	1½	55
Cootehill—Lavastrand	Tullyvin, Stradone	Car	7	4	2	–	–	12½
Killeshandra—Dublin	Crossdoney, Mount Nugent, Oldcastle, Athboy, Trim, Clonee	Coach	3	16	12	2½	1¼	64

COUNTY OF CLARE.

						d.	d.	
Ennis—Kilfinan	~~~~	Car	7	6	4	–	1½	–
„ Kilrush	~~~~	Mail Car	7	6	3	–	1¼	21
„ Limerick	Clare, Newmarket-on-Fergus	Coach	7	15	10	2¼	1¼	18½
„ Limerick	Clare, Newmarket-on-Fergus	2 Coaches	6	15	10	2½	1½	18½
Killaloe—Limerick	Castleconnell	Coach	6	15	9	–	1¾	12
„ Limerick	Castleconnell	Car (d)	6	12	10	–	1¾	–
„ Milltown	Ennistymon	Caravan	7	14	8	1	–	39
„ Milltown	Ennistymon	Mail Car	7	4	1	–	1½	39

(a) Cars constantly ply between these places; the number given is on the authority of a person who kept an account for a week.

(b) This is a Branch from the Dublin and Cavan coach.

(c) A branch Coach to Belturbet.

(d) This Car is timed to suit the arrival and departure of the Steam Packets which ply between Killaloe and Shannon-harbour; a boat is substituted for it during the summer months.

COUNTY OF CORK.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number Carried.	Fare per Mile.		Distance in Irish Miles between Places in first Column.
						Inside.	Outside.	
						d.	d.	
Bandon—Dunmanway	——	Coach (a)	6	15	10	2½	1½	–
„ Dunmanway	——	Mail Car	7	4	1	–	1½	–
„ Timoleague	——	Car	7	9	4	–	1½	–
Bantry—Dunmanway	——	Car	7	8	3	–	1½	15
Cork—Bandon	Innishannon	3 Coaches	6	15	12	2	1½	14
„ Bandon	Innishannon	Car	6	9	6	–	1½	14
„ Bantry	Innishannon, Bandon, Clonakilty, Roscarberry, Skibbereen	Mail Coach	7	8	5	2⅔	2	44
„ Charleville	Mallow	Coach	6	15	12	4	3	34
„ Clonakilty	Innishannon, Bandon	Car	6	10	9	–	1½	24
„ Dublin	Rathcormac, Fermoy, Clonmel, Kilkenny, Carlow, &c	Mail Coach	7	8	5	4	2	125
„ Dublin	Fermoy, Cahir, Cashel, Abbeyleix, Athy, Naas, Rathcoole	Mail Coach	7	8	5	4	2	125
„ Fermoy	Rathcormac	Coach	6	15	7	2¾	2	16
„ Kanturk	——	Car (b)	6	14	8	–	1½	26
„ Kanturk	——	Car	3	14	8	–	1½	26
„ Kilkenny	Rathcormac, Fermoy, Mitchelstown, Cahir, Clonmel	Car	6	16	10	–	2	67½
„ Killarney	Ballincollig, Macroom, Ballyvourney	Car	3	8	4	–	2	45
„ Kinsale	——	Mail Coach	7	8	4	2½	1½	13
„ Limerick	Mallow, Buttevant, Charleville, Kilmallock, Bruff	Mail Coach	7	8	5	3¾	2¼	50½
„ Limerick	Rathcormac, Fermoy, Kildorrery, Kilmallock, Bruff	Car	6	11	8	–	2	50½
„ Macroom	Ballincollig	Coach	6	15	8	3	2	18
„ Mallow	——	Coach	6	15	8	3½	1¾	16
„ Millstreet	Ballincollig	Car	6	4	2	–	1½	28
„ Mitchelstown	Rathcormack, Fermoy	Caravan	6	10	6	2	–	24
„ Rathkeale	Mallow, Buttevant, Charleville, Dromcolliher, Newcastle	Car	6	8	4	–	1¼	66
„ Tipperary	Mitchelstown	Coach	3	12	5	5	–	48
„ Tralee	Ballincollig, Macroom, Millstreet, Killarney	Mail Coach	7	8	4	3½	2	60
„ Tralee	Mallow, Kanturk, Newmarket, Castle Island	Car (c)	3	8	4	–	1½	60
„ Waterford	Middleton, Killeagh, Yonghal, Tallow, Lismore, Cappoquin, Dungarvan, Kilmacthomas	Mail Coach	7	8	3	4½	2¼	71
„ Waterford	Fermoy, Mitchelstown, Cahir, Clonmel, Carrick-on-Suir	Car	6	16	8	–	1¾	71½
Fermoy—Castlemartyr	Rathcormac, Middleton	Mail Car	7	6	1	–	2	19
Mallow—Doneraile	——	Car	6	6	3	–	2	5
„ Kanturk	——	Car	6	6	3	–	2	11
„ Mitchelstown	Doneraile, Kildorrery	Car	6	6	3	–	2	18
Newmarket—Kanturk	——	Car	6	6	4	–	2	4
Yonghal—Dungarvan	Clashmore	Car	6	6	4	–	2	–
„ Waterford	Clashmore, Dungarvan, Kilmacthomas	Mail Coach	7	8	2	4½	2¼	–

COUNTY OF DOWN.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number Carried.	Fare per Mile.		Distance in Irish Miles between Places in first Column.
						Inside.	Outside.	
						d.	d.	
Ballynahinch—Belfast	Saintfield, Newton-Breda	Coach	3	16	13	2¼	1¼	13
„ Belfast	Saintfield, Newton-Breda	Car	2	6	4	–	1	13
Banbridge—Belfast	Dromore, Hillsborough, Lisburn	Coach	6	16	14	2	1½	20
„ Belfast	Dromore, Hillsborough, Lisburn	Car	3	8	6	–	1½	20
„ Lurgan	——	Car	1	6	4	–	2	7
„ Newry	Loughbrickland	Car	6	6	4	–	2	10
„ Newry	Loughbrickland	Car	1	6	4	–	2	10
„ Rathfriland	——	Car	1	6	4	–	1½	7½
Bangor—Belfast	Hollywood	Mail Car	7	6	4	–	1¼	10
Castlewellan—Belfast	Ballynahinch	Caravan	2	10	8	2	–	22
Comber—Belfast	——	2 Caravans	6	12	10	1	–	7
„ Killyleagh	Killinchy	Car	6	6	4	–	1¼	–
Crossgar—Belfast	Saintfield	Car	2	6	4	–	1¼	13
Donaghadee—Belfast	Bangor, Hollywood	Coach	6	16	10	2	1	15
„ Belfast	Newtown-Ards	Mail Car	7	6	3	–	1½	16
Downpatrick—Belfast	Crossgar, Saintfield	Coach	3	16	11	3½	2	18
„ Belfast	Crossgar, Saintfield	Caravan	3	12	7	1½	–	18
„ Belfast	Killyleagh, Killinchy, Comber	Mail Car	7	6	3	–	2	21
„ Belfast	——	Car	1	6	3	–	1½	21
„ Newry	Clough, Castlewellan, Rathfriland	Mail Car	7	6	4	–	2½	24
Grey Abbey—Belfast	Newtown-Ards	Car	5	6	3	–	1¼	14
Hilltown—Newry	——	3 Cars	2	6	3	–	1½	8
Hollywood—Belfast	——	Car	7	6	5	–	1½	4
Kilkeel—Newry	Rosstrevor, Warrenpoint	Car	3	6	4	–	1½	15
Newtown-Ards—Belfast	——	3 Caravans	6	14	6	1¼	–	8
„ Belfast	——	Caravan	3	14	6	1½	–	8
„ Belfast	——	Car	6	6	4	–	1¼	8
„ Belfast	——	Car	1	6	4	–	1½	8
Portaferry—Belfast	Kircubbin, Grey Abbey, Newtown-Ards	Coach	6	16	12	–	1½	22
„ Belfast	Kircubbin, Grey Abbey, Newtown-Ards	Mail Car	7	4	3	–	1½	22
Rathfriland—Newry	——	Car	7	6	4	–	2	8
Saintfield—Belfast	Newton-Breda	Car	3	6	5	–	1½	9
Warrenpoint—Kilkee	Rosstrevor	Car	7	6	5	–	2½	13
„ Newry	——	50 Cars (d)	7	6	4	–	1¼	5
„ Rosstrevor	——	12 Cars	7	6	4	–	3	2

(a) Meets the Cork and Bandon Coach. (b) A Car goes on to Newmarket. (c) A branch goes from Castle Island to Listowel.
(d) Cars constantly ply between these places; the number given is on the authority of a person who kept an account for a week.

Appendix B.
No. 5.

Public Conveyances.

COUNTY OF DONEGAL.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile. Inside.	Fare per Mile. Outside.	Distance in Irish Miles between Places in first Column
						d.	d.	
Ballyshannon—Enniskillen	——	Mail Coach	7	8	3	3¼	2	22
,, Killybegs	Ballintra, Donegal, Mountcharles, Duncanely	Mail Car	7	4	2	–	2	24½
,, Sligo	Tullyhase	Car	6	6	3	–	2	21¼
Buncrana—Londonderry	Fahan	Mail Car	7	10	5	–	2	10½
Moville—Londonderry	——	Mail Car	7	12	5	–	2	–
Ramelton—Strabane	Letterkenny, Lifford	Mail Car	7	4	3	–	2¼	20

COUNTY OF DUBLIN.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile. Inside.	Fare per Mile. Outside.	Distance in Irish Miles between Places in first Column
						d.	d.	
Dublin—Arklow	Bray, Newtown-Mount-Kennedy, Rathdrum	Car	6	6	3	–	1½	40
,, Armagh	Ashbourne, Duleek, Drogheda, Dunleer, Castlebellingham, Dundalk, Newry, Market-hill	Coach	6	15	10	4¾	2¾	64
,, Armagh	Swords, Balbriggan, Julianstown, Drogheda, Dunleer, Castlebellingham, Dundalk, Newry, Market-hill	Coach	3	15	12	3	2½	64
,, Artane	——	Car	4	–	2	–	1¼	–
,, Athboy	Clonee, Trim	Caravan	7	14	8	1½	–	37
,, Balbriggan	Drumcondra, Santry, Swords	Caravan	7	18	15	2	–	15
,, Balbriggan	——	Mail Car	7	–	3	–	2	15
,, Balbriggan	Swords	2 Cars	6	–	6	–	1	15
,, Baldoyle	——	Car	2	6	4	–	1¾	–
,, Ballinasloe	Lucan, Leixlip, Maynooth, Kilcock, Enfield, Clonard, Kinnegad, Kilbeggan, Moate, Athlone, Thomastown	Coach (a)	3	15	10	3	2	72
,, Belfast	Ashbourne, Duleek, Drogheda, Dunleer, Castlebellingham, Lurgangreen, Dundalk, Flurry-bridge, Newry, Loughbrickland, Banbridge, Dromore, Hillsborough, Lisburn	Mail Coach	7	8	6	4¾	2⅜	80
,, Belfast	Ashbourne, Duleek, Drogheda, Dunleer, &c.	Coach	7	16	11	3½	1 7/16	80
,, Belfast	Swords, Balbriggan, Julianstown, Drogheda, Dunleer, &c.	Coach	7	16	11	3	2½	80
,, Boyle	Lucan, Maynooth, Kilcock, Enfield, Clonard, Kinnegad, Mullingar, Rathowen, Edgeworthstown, Longford, Newtownforbes, Drumsna, Carrick-on-Shannon	Coach	3	15	9	3	2	85
,, Bray	——	Omnibus	7	9	5	1¾	–	10
,, Carlow	Rathcoole, Naas, Kilcullen, Ballitore, Castledermot	Coach	6	15	12	3	1½	39
,, Cavan	Clonee, Dunshaughlin, Navan, Kells, Virginia	Coach (b)	6	15	9	2⅞	1⅝	55
,, Celbridge	Lucan	Coach	7	15	7	–	1	11
,, Celbridge	Lucan	2 Cars	7	6	4	–	1	11
,, Celbridge	——	2 Cars	3	6	4	–	1	11
,, Clane	Lucan, Celbridge	Caravan	6	16	10	1½	–	–
,, Clones	Clonee, Dunshaughlin, Navan, Nobber, Kingscourt, Shercock, Cootehill, Newbliss	Coach	3	15	8	3	1¾	68
,, Clonmel	Rathcoole, Naas, Kilcullen, Ballytore, Castledermot, Carlow, Leighlinbridge, Royal Oak, Kilkenny, Callan	Coach	3	15	11	3½	1¾	82
,, Coolock	——	Car	7	–	1	–	–	–
,, Cork	Rathcoole, Naas, Kilcullen, Ballytore, Castledermot, Carlow, Leighlinbridge, Royal Oak, Kilkenny, Callan, Clonmel, Clogheen, Kilworth, Fermoy, Rathcormac	Mail Coach	7	8	5	4	2	125
,, Cork	Rathcoole, Naas, Kilcullen, Athy, Stradbally, Abbeyleix, Durrow, Johnstown, Littleton, Cashel, Cahir, Mitchelstown, Fermoy, Rathcormac	Mail Coach	7	8	5	4	2	125
,, Donecarney	——	Car	7	–	1	–	–	–
,, Drogheda	Swords, Balbriggan, Julianstown	Coach	6	15	12	3	2½	23
,, Drogheda	Swords, Balbriggan, Julianstown	Caravan	6	16	12	1½	–	23
,, Drogheda	Swords, Balbriggan, Julianstown	Mail Car	7	6	4	–	1¾	23
,, Drogheda	Ashbourne	Car	6	14	10	–	2	23
,, Dungannon	Ashbourne, Drogheda, Dunleer, Dundalk, Newry, Market-hill, Armagh, Charlemont, Moy	Coach	3	15	7	3⅛	1⅜	76
,, Enfield	Leixlip, Maynooth, Kilcock	Car	6	6	5	–	1¼	20
,, Enniscorthy	Bray, Newtown-Mt.-Kennedy, Rathdrum, Arklow, Gorey	Coach	3	15	9	3	2	62
,, Enniskillen	Clonee, Dunshaughlin, Navan, Kells, Virginia, Lavastrand, Cavan, Wattlebridge, Lisnaskea	Mail Coach	7	8	4	3	2¼	80
,, Enniskillen	Clonee, Dunshaughlin, Navan, &c.	Coach	3	15	11	2½	1½	80
,, Galway	Lucan, Maynooth, Kilcock, Enfield, Clonard, Kinnegad, Kilbeggan, Moate, Athlone, Thomastown, Ballinasloe, Loughrea, Oranmore,	Mail Coach	7	8	5	3½	2	105

(a) Also a Canal Boat daily for 80, and averaging 30 passengers, at 1½*d.* each.
(b) A branch Coach goes to Belturbet.

Appendix B.
No. 5.

Public Conveyances.

COUNTY OF DUBLIN—*continued.*

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile.		Distance in Irish Miles between Places in first Column
						Inside.	Outside.	
						d.	*d.*	
Dublin—Galway	Lucan, Maynooth, Kilcock, Enfield, Clonard, Kinnegad, Kilbeggan, Moate, Athlone, Ballinasloe, Loughrea, Oranmore	Coach (a)	6	15	10	3	2	105
„ Garristown	—	Car	7	6	4	–	1½	–
„ Granard	Clonee, Trim, Athboy, Castlepollard	2 Coaches (b)	3	15	10	1¾	¾	59
„ Howth	—	Mail Car	7	6	3	–	1	7
„ Howth	—	2 Cars	7	6	3	–	–	7
„ Kells	Clonee, Dunshaughlin, Navan	Coach	7	15	7	2¼	1½	30
„ Kells	Clonee, Dunshaughlin, Navan	Car	7	16	10	–	1¼	30
„ Kilcock	Leixlip, Maynooth	2 Cars	7	6	4	–	1¼	14
„ Kilcock	—	4 Cars	6	6	5	–	1¼	14
„ Kilcock	—	Car	3	–	8	–	1	14
„ Kilcullen	Rathcoole, Naas	Caravan (c)	6	16	14	1¼	–	21
„ Kilkenny	Tallaght, Blessington, Baltinglass, Castledermot, Carlow, Bagnalstown, Royal Oak	Mail Coach	7	8	5	2¼	1½	57
„ Kilkenny	Rathcoole, Naas, Kilcullen, Athy, Castlecomer	2 Coaches	3	15	11	2½	1½	57
„ Kilkenny	Rathcoole. Naas, Kilcullen, Ballitore, Castledermot, Carlow, Leighlinbridge, Royal Oak	Coach	6	15	11	2½	1¼	57
„ Killysandra	Clonee, Trim, Athboy, Oldcastle, Mount Nugent, Crossdoney	Coach	3	16	12	2¼	1¼	64
„ Kingstown	—	Mail Coach (d)	7	8	2	–	–	–
„ Leixlip	Lucan	4 Cars	7	6	4	–	1½	8
„ Leixlip	Lucan	Car	4	6	4	–	1¼	8
„ Limerick	Rathcoole, Naas, Newbridge, Kildare, Monasterevan, Ballybrittas, Maryborough, Mountrath, Borris-in-Ossory, Roscrea, Moneygall, Nenagh	Mail Coach	7	8	5	4	2½	93
„ Limerick	Rathcoole, Naas, Newbridge, Kildare, Monasterevan, Ballybrittas, Maryborough, Mountrath, Borris-in-Ossory, Roscrea, Moneygall, Nenagh	Coach	7	15	9	3¾	2½	93
„ Londonderry	Ashbourne, Slane, Drumcondra, Carrickmacross, Castleblaney. Monaghan, Emyvale, Aughnacloy, Ballygawley, Omagh, Newtownstewart, Strabane	Mail Coach	7	8	4	5	3	113
„ Lucan	—	5 Cars	6	6	5	–	1½	6
„ Malahide	—	Car	7	6	4	–	1	–
„ Malahide	—	2 Cars	2	6	4	–	1½	–
„ Maynooth	Lucan, Leixlip	2 Cars	7	6	4	–	1	11
„ Maynooth	Lucan, Leixlip	4 Cars	3	6	3	–	1	11
„ Mountrath	Rathcoole, Naas, Kilcullen, Stradbally, Abbeyleix	Caravan	7	16	9	–	1½	47
„ Mountmellick	Rathcoole, Naas, Newbridge, Kildare, Monasterevan, Portarlington	Caravan (e)	3	10	4	–	–	40
„ Mullingar	Lucan, Maynooth, Kilcock, Enfield, Clonard, Kinnegad	Coach	3	15	9	3	2	38
„ Naas	Rathcoole	Caravan (f)	7	16	13	–	1¼	16
„ Naul	—	Car	6	–	2	–	–	–
„ Navan	Ashbourne	Coach	6	16	5	2	1¼	23
„ Newry	Ashbourne, Drogheda, Dunleer, Castlebellingham, Dundalk	Caravan	6	16	10	2¼	–	50
„ Newtownbarry	Blessington, Baltinglass, Tullow, Clonegall	Coach	3	15	7	2¼	1½	63
„ Omagh	Ashbourne, Slane, Drumcondra, Carrickmacross, Castleblaney, Monaghan, Emyvale, Aughnacloy, Ballygawley	Coach	3	15	8	5	3	86
„ Parsonstown	Rathcoole, Naas, Newbridge, Kildare, Monasterevan, Portarlington, Mountmellick, Clonaslee, Kinnety	Coach	6	15	9	3	1¾	68
„ Rathangan	Rathcoole, Naas, Newbridge	Coach (g)	6	15	8	2	1	31
„ Ratheny	—	2 Cars	7	6	1	–	–	–
„ Rathfarnham	—	Omnibus	–	–	–	–	–	–
„ Rathmines	—	Omnibus	–	–	–	–	–	–
„ Roscrea	Rathcoole, Naas, Newbridge, Kildare, Monasterevan, Maryborough	Caravan	6	16	9	2	–	59
„ Skerries	Drumcondra, Santry, Swords	Car	6	16	7	–	1½	–
„ Slane	—	Car	6	6	3	–	1½	22
„ Sligo	Lucan, Maynooth, Kilcock, Enfield, Clonard, Kinnegad, Mullingar, Rathowen, Edgeworthstown, Longford, Newtownforbes, Dromod, Drumsna, Carrick-on-Shannon, Boyle, Collooney	Mail Coach	7	8	5	3	2	104
„ Sligo	Lucan, Maynooth, Kilcock, Enfield, Clonard, Kinnegad, Mullingar, Rathowen, Edgeworthstown, Longford, Newtownforbes, Dromod, Drumsna, Carrick-on-Shannon, Boyle, Collooney	Coach	3	15	10	3	2	104

(a) A branch Coach goes from Ballinasloe to Tuam.

(b) These Coaches run in the same direction on the same days. (c) A Car goes on from Kilcullen to Dunlavin.

(d) From a return given by the Post Office it appears that this Mail was full every day of the year 1834, being the year preceding the construction of the Railway. Besides the Passengers by the Railway, a number of persons are conveyed by Cars, which constantly ply between Dublin, Blackrock, and Kingstown.

(e) Besides a Fly-boat, averaging 23 passengers daily, at 1¼*d.* per mile per head.

(f) Passengers forwarded by Cars to Newbridge and Ballymore-Eustace.

(g) Also a Fly-boat daily, able to contain 86 passengers, and averaging 46 passengers, at 1*d.* per mile each.

Appendix B.
No. 5.

Public Conveyances.

COUNTY OF DUBLIN.—(*continued.*)

Towns between which Conveyances run.		Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile.		Distance in Irish Miles between Places in first Column.
							Inside.	Outside.	
							d.	*d.*	
Dublin—	Swords	Drumcondra	2 Cars	6	6	4	–	1½	6
"	Swords	Drumcondra	Car	3	6	3	–	1½	6
"	Thurles	Rathcoole, Naas, Newbridge, Kildare, Monasterevan, Ballybrittas, Maryborough, Mountrath, Rathdowney, Templemore	Coach	3	15	9	2¾	1⅓	75
"	Trim	Clonee	Omnibus	3	14	10	1¼	–	25
"	Trim	Clonee	Car	3	6	4	–	1¼	25
"	Waterford	Rathcoole, Naas, Kilcullen, Ballytore, Castledermot, Carlow, Leighlinbridge, Royal Oak, Gouran, Thomastown	Mail Coach	7	8	4	4	2	75
"	Waterford	Rathcoole, Naas, Kilcullen, Ballytore, Castledermot, Carlow, Leighlinbridge, Royal Oak, Gouran, Thomastown	Coach	3	15	11	3½	1¾	75
"	Wexford	Bray, Delgany, Newtown-Mount-Kennedy, Ashford, Rathdrum, Arklow, Gorey, Camolin, Ferns, Enniscorthy	Mail Coach	7	8	4	3¾	2½	74
"	Wexford	Bray, Delgany, Newtown-Mount-Kennedy, Ashford, Rathdrum, Arklow, Gorey, Camolin, Ferns, Enniscorthy	Coach	6	15	9	2¼	1½	74
"	Wexford	Baltinglass, Tullow, Enniscorthy, Wexford	Coach	6	15	8	2¼	1½	74
"	Wicklow	Bray, Newtown-Mount-Kennedy	2 Caravans	6	16	12	1	0¾	24
Kingstown—	Bray	——	Omnibus (a)	21	13	13	2	–	6
"	Bray	——	Omnibus	12	13	10	1⅓	–	6
"	Bray	——	2 Cars	14	6	3	–	1½	6
"	Delgany	Bray	Car	6	6	3	–	1½	–

Besides the Coaches and Cars in the foregoing Return, two swift Passage Boats start from Dublin every morning on the Grand Canal, one at ½ past 7 o'Clock for Kilbeggan, the other at 8 o'Clock for Mountmellick. These are met by Branch Boats, which convey passengers to and from Tullamore and Athy respectively.

A night Boat leaves Dublin every afternoon at 2 o'Clock for Ballinasloe. The day Boats travel at the rate of 10 British miles per hour between Locks The night Boat at the rate of 6 British miles.

COUNTY OF FERMANAGH.

Towns between which Conveyances run.		Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Inside.	Outside.	Distance in Irish Miles between Places in first Column.
							d.	*d.*	
Enniskillen—	Armagh	Five-mile-town, Clogher, Augher, Aughnacloy, Caledon	Mail Car	7	6	3	–	1½	42
"	Armagh	Five-mile-town, Clogher, Augher, Aughnacloy, Caledon	Car	6	6	3	–	1½	42
"	Ballyshannon	——	Mail Coach	7	8	3	3¼	2	23
"	Belfast	Lisnaskea, Clones, Monaghan, Armagh, Portadown, Lurgan, Moira, Lisburn	Mail Coach	7	8	4	4¼	2½	76
"	Clogher	——	Mail Car	7	6	4	–	1½	17
"	Clogher	——	Car	6	6	4	–	1½	17
"	Dublin	Lisnaskea, Wattlebridge, Cavan, Lavastraud, Virginia, Navan, Kells, Dunshaughlin, Clonee	Mail Coach	7	8	4	3	2¼	80
"	Dublin	Navan, Dunshaughlin, Clonee	Coach	3	15	11	2¼	1½	80
"	Londonderry	Pettigoe, Castlederg, Strabane	Coach	6	15	6	2¾	1¾	42
"	Pettigoe	Irvinestown, Kish	Mail Car	7	4	2	–	1½	16
"	Sligo	Manor Hamilton	Mail Car	7	6	4	–	2	32

COUNTY OF GALWAY.

Towns between which Conveyances run.		Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Inside.	Outside.	Distance in Irish Miles between Places in first Column.
							d.	*d.*	
Ballinasloe—	Athlone	——	Car	6	4	2	–	1½	11
"	Dublin	Thomastown, Athlone, Moate, Kilbeggan, Kinnegad, Clonard, Enfield, Kilcock, Maynooth, Leixlip, Lucan	Coach	3	15	10	3	2	72
"	Roscrea	Eyrecourt, Banagher, Parsonstown	Mail Car	7	6	3	–	2¼	30
"	Westport	Ahascragh, Castleblakeney, Tuam, Hollymount, Ballyglass, Castlebar	Mail Coach	7	8	4	3¾	2½	59¾
Eyrecourt—	Portumna	——	Mail Car	7	4	1	–	2¼	9½
Galway—	Ballinasloe	Oranmore, Loughrea, Aughrim	Car (b)	7	14	7	–	2	40¾
"	Clifden	Outerard	Mail Car	7	4	2	–	2	51
"	Dublin	Oranmore, Loughrea, Ballinasloe, Thomastown, Athlone, Moate, Kilbeggan, Kinnegad, Clonard, Enfield, Kilcock, Maynooth, Lucan	Mail Coach	7	8	5	3½	2	105
"	Dublin	Oranmore, Loughrea, Ballinasloe, Athlone, Moate, Kilbeggan, Kinnegad, Clonard, Enfield, Kilcock, Maynooth, Lucan	Coach (c)	6	15	10	3¾	2½	105
"	Limerick	Oranmore, Gort, Ennis, Newmarket-on-Fergus	Mail Coach	7	8	3	3	2	66
"	Tuam	Clare	Mail Coach	7	8	2	3	2	20½
"	Tuam	Clare	Car	6	6	3	–	1¾	20½
Loughrea—	Gort	——	Mail Car	7	4	1	–	2	12
Portumna—	Roscrea	Burrosakane, Cloughjordan, Shinrone	Mail Car	7	6	2	–	2	20½
Tuam—	Ballinasloe	Castleblakeney, Ahascragh	Coach (d)	6	15	6	3½	2¼	46
"	Ballinasloe	Castleblakeney, Ahascragh	Car	7	12	7	–	1¾	46
"	Ballinrobe	——	Car	7	4	3	–	1½	15
"	Dunmore	——	Mail Car	7	4	3	–	1½	8
"	Headford	——	Mail Car	7	4	3	–	1½	10
"	Westport	Hollymount, Ballyglass, Castlebar	Car	7	12	7	–	1¾	34

(a) Runs three times a-day in winter, and four in summer, to meet the Kingstown Railway.
(b) To and from Canal Boats. (c) A Branch goes from Ballinasloe to Tuam.
(d) A Branch to the Dublin and Galway Coach to meet the Canal Boat.

Appendix B.
No. 5.
Public Conveyances.

COUNTY OF KERRY.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile.		Distance in Irish Miles between Places in first Column
						Inside.	Outside.	
						d.	d.	
Killarney—Cork	Ballyvourney, Macroom, Ballincollig	Car	3	8	4	–	2	43
” Kenmare	——	Car	7	6	3	–	1½	16
” Killorglin	——	Car	6	4	2	–	1½	10½
” Limerick	Castle Island, Newcastle, Rathkeale, Adare	Car	7	11	5	–	1½	39
Listowel—Castle Island	Abbeyfeale	Car	3	6	3	–	1¾	28
Tralee—Ballyhigue	Ardfert	Mail Car	7	4	2	–	1	8
” Cahirciveen	Milltown	Mail Car	7	4	2	–	1¾	30½
” Cork	Killarney, Millstreet, Macroom, Ballincollig	Mail Coach	7	8	4	3¾	2	60½
” Cork	Castle Island, Newmarket, Kanturk, Mallow	Car (a)	3	8	4	–	1½	60½
” Dingle	——	Mail Car	7	4	2	–	2	20½
” Killarney	Castle Island	Coach	7	12	6	–	–	16½
” Killarney	Castle Island	Car	7	8	3	–	1½	16½
” Limerick	Abbeyfeale, Newcastle, Rathkeale, Adare	Mail Coach	7	8	4	3¾	2	39½
” Limerick	Listowel, Tarbert, Glinn, Askeaton, Rathkeale	Car	7	6	3	–	2	39½
COUNTY OF KILDARE.								
						d.	d.	
Athy—Carlow	——	Caravan	7	16	8	1½	1	8¾
Celbridge—Dublin	Lucan	Coach	7	15	7	–	–	11
” Dublin	Lucan	2 Cars	7	6	4	–	1	11
” Dublin	Lucan	2 Cars	3	6	4	–	1	11
Dunlavin—Kilcullen	——	2 Cars (b)	6	12	9	–	1	5
Enfield—Dublin	Kilcock, Maynooth, Leixlip	Car	6	6	5	–	1¼	20
Kilcock—Dublin	Maynooth, Leixlip	2 Cars	7	6	4	–	1¼	14
” Dublin	——	4 Cars	6	6	5	–	1¼	14
” Dublin	——	Car	3	–	8	–	1	14
” Trim	Summerhill	Mail Car	7	4	2	–	1½	10
Kilcullen—Dublin	Naas, Rathcoole	Caravan	6	16	14	1¼	–	21
Leixlip—Dublin	Lucan	4 Cars	7	6	4	–	1¼	8
” Dublin	——	Car	4	6	4	–	1¼	8
Maynooth—Dublin	Leixlip, Lucan	2 Cars	7	6	4	–	1	11
” Dublin	——	4 Cars	3	6	3	–	1	11
Naas—Ballymore-Eustace	——	Car (c)	7	6	4	–	1¼	5
Naas—Dublin	Rathcoole	Caravan	7	16	13	–	1½	16
Naas—Newbridge	——	Car (d)	7	6	4	–	1¼	5
Rathangan—Dublin	Newbridge, Naas, Rathcoole	Coach (e)	6	15	8	2	1	31
COUNTY OF KILKENNY.								
						d.	d.	
Castlecomer—Carlow	——	Mail Car	7	4	2	–	1½	11
Kilkenny—Carrick-on-Suir	Kells, Kilmaganny	Car	6	6	3	–	2½	22
” Castlecomer	——	Car	6	8	5	–	1¾	8½
” Clonmel	Callan	Car	3	6	4	–	2	24
” Cork	Clonmel, Cahir, Mitchelstown, Fermoy, Rathcormac	Car	6	16	10	–	2	65½
Dublin	Royal Oak, Bagnalstown, Carlow, Castledermot, Baltinglass, Blessington, Tallaght	Mail Coach	7	8	5	2½	1¼	57
” Dublin	Castlecomer, Athy, Kilcullen, Naas, Rathcoole	2 Coaches	3	15	11	2½	1¼	57
” Dublin	Royal Oak, Leighlinbridge, Carlow, Castledermott, Ballytore, Kilcullen, Naas, Rathcoole	Coach	6	15	11	2½	1¼	57
” Goresbridge	——	Car	2	6	5	–	1	9
” Mountmellick	Ballyragget, Durrow, Abbeyleix, Maryborough	Mail Car	7	12	8	–	2	29½
” Thomastown	——	Car	7	6	4	–	1½	9
” Thurles	Freshford, Johnstown, Urlingford, Littletown	Mail Car	7	4	3	–	2	20¾
” Urlingford	Freshford, Johnstown	2 Cars	6	6	4	–	1½	13
” Waterford	Knocktopher, Stoneyford, Mullinavatt	Coach	3	15	10	5¼	2¾	24
Piltown—Glenbower	——	Mail Car	7	6	1	–	2	6¾
Thomastown—New Ross	Innistiogue	Mail Car	7	4	3	–	2½	–
KING'S COUNTY.								
						d	d	
Banagher—Kilbeggan	Ballycumber, Clara, Kilbeggan	Mail Car	7	4	2	–	2¼	20¾
Kinnety—Mountmellick	Clonaslie	Car	7	6	3	–	1	15
Parsonstown—Borrisokane	——	Car (f)	6	6	3	–	2	10
” Dublin	Kinnety, Clonaslie, Mountmellick, Portarlington, Monasterevan, Kildare, Newbridge, Naas, Rathcoole	Coach	6	15	9	3	1¾	68
” Gillan Harbour	——	Car	7	6	3	–	2¼	10
” Mullingar	Kinnety, Frankford, Tullamore, Kilbeggan	Car	7	6	2	–	2¼	37

(a) A branch Car goes from Castle Island to Listowel.
(b) One of these is a branch from the Dublin and Kilcullen Caravan.
(c) This is a branch from the Dublin and Naas Caravan.
(d) This is a branch from the Dublin and Naas Caravan.
(e) Also a Fly-Boat daily, able to contain 86, and averaging 46 passengers, at 1*d.* per mile each.
(f) To meet the Canal Boats.

Appendix B.
No. 5.

Public Conveyances.

COUNTY OF LEITRIM.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile. Inside.	Fare per Mile. Outside.	Distance in Irish Miles between Places in first Column.
						d.	d.	
Carrick-on-Shannon—Ballynamore	Cashcarrigan	Mail Car	7	4	2	–	1¾	14¾

COUNTY OF LIMERICK.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile. Inside.	Fare per Mile. Outside.	Distance in Irish Miles between Places in first Column.
						d.	d.	
Limerick—Ballingarry	Patrick's Well, Adare	Car	6	6	4	–	1	14
" Charleville	Bruff, Kilmallock	Coach	6	15	12	2¼	1	20¼
" Clonmel	Tipperary, Cahir	Mail Car	7	4	2	–	2	40
" Cork	Bruff, Kilmallock, Charleville, Buttevant, Mallow	Mail Coach	7	8	5	3¾	2¼	51¾
" Cork	Bruff, Kildorrery, Fermoy, Rathcormac	Car	6	11	8	–	2	48
" Croome	—	3 Cars	6	10	6	–	1	10
" Dublin	Nenagh, Moneygall, Roscrea, Burros-in-Ossory, Mountrath, Maryborough, Ballybrittas, Monasterevan, Kildare, Newbridge, Naas, Rathcoole	Mail Coach	7	8	5	4	2½	93
" Dublin	Nenagh, Moneygall, Roscrea, Burros-in-Ossory, Mountrath, Maryborough, Ballybrittas, Monasterevan, Kildare, Newbridge, Naas, Rathcoole	Coach	7	15	9	3¾	2¼	93
" Ennis	Newmarket-on-Fergus, Clare	Coach	7	15	10	2½	1½	20½
" Ennis	Newmarket-on-Fergus, Clare	2 Coaches	6	15	10	2½	1¼	20½
" Galway	Newmarket-on-Fergus, Ennis, Gort, Oranmore	Mail Coach	7	8	3	3	2	52
" Garryspillar	Hospital	Car	6	10	7	–	1½	19¾
" Kilfinan	Hospital	Car	6	8	5	–	1½	22
" Killaloe	Castleconnell	Coach	6	15	9	–	1¾	12½
" Killaloe	—	Car (a)	6	12	10	–	1½	12½
" Killarney	Adare, Rathkeale, Newcastle, Castle Island	Car	7	11	5	–	1½	53½
" Nenagh	—	Coach	6	15	10	2½	1½	20½
" Newcastle	Adare, Rathkeale	Car	6	16	13	–	1	20½
" Newport	Castleconnell	Car	6	10	6	–	1	8
" Pallas-Kenry	Hospital	Car	6	12	8	–	1	10
" Rathkeale	Adare	Car	6	12	9	–	1	14
" Rathkeale	Adare	Car	6	6	4	–	1	14
" Shanagolden	Askeaton, Kildimo	Caravan	6	16	9	1	–	22
" Tipperary	—	2 Cars	6	6	5	–	1	20½
" Tralee	Adare, Rathkeale, Newcastle, Abbeyfeale	Mail Coach	7	8	4	3¾	2	49¾
" Tralee	Rathkeale, Askeaton, Glin, Tarbert, Listowel	Car	7	6	3	–	2	56½
" Waterford	Tipperary, Cahir, Clonmel, Carrick-on-Suir, Piltown	Mail Coach	7	8	3	3¾	2	62½
" Waterford	Tipperary, Cahir, Clonmel, Carrick-on-Suir	Car	6	10	6	–	2	62½
Rathkeale—Cork	Newcastle, Drumcollaher, Charleville, Buttevant, Mallow	Car	6	8	4	–	1¾	47½
Tarbert—Ballylongford	—	Car	6	16	8	–	1¼	5½

COUNTY OF LONDONDERRY.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile. Inside.	Fare per Mile. Outside.	Distance in Irish Miles between Places in first Column.
						d.	d.	
Coleraine—Ballycastle	Dervock	2 Caravans (b)	1	16	12	–	0½	16
" Ballymena	Dunloy, Ballymoney	Car	6	4	2	–	1½	22
" Belfast	Ballymoney, Cloughmills, Clough, Ballymena, Kells, Antrim	Coach	3	16	9	4	2	44
" Bushmills	—	2 Cars	1	6	5	–	2	–
" Dervock	—	3 Cars (c)	1	6	5	–	1	–
" Garvagh	—	Car	1	4	3	–	1½	–
" Newry	Garvagh, Magherafelt, Cookstown, Dungannon, Moy, Armagh, Markethill	Mail Coach	7	8	3	5	3	66
" Portrush	—	2 Cars (d)	12	6	4	–	1¼	–
Kilrea—Belfast	Antrim	Car	3	6	4	–	1½	32
Londonderry—Belfast	Newtown-Limavady, Coleraine, Ballymoney, Ballymena, Randalstown, Antrim	Mail Coach	7	8	4	5¼	3¼	71
" Buncrana	Fahan	Mail Car	7	10	5	–	2	10
" Coleraine	Newtown-Limavady	Car	6	6	4	–	2	26
" Dublin	Strabane, Newtownstewart, Omagh, Ballygawley, Aughnacloy, Emyvale, Monaghan, Castleblaney, Drumcondra, Slane, Ashbourne	Mail Coach	7	8	4	5	3	113
" Dungiven	Muff	Mail Car	7	4	3	–	1¾	15
" Enniskillen	Strabane, Castlederg, Pettigoe	Coach (e)	6	15	6	2¾	1¾	42
" Magherafelt	Castledawson, Toome, Randalstown, Antrim	Caravan	3	12	9	–	–	31
" Moville	—	Mail Car	7	12	5	–	2	16
" Omagh	Strabane, Newtownstewart	Coach	6	16	10	2	1¾	26
" Sligo	Strabane, Stranorlar, Donegal, Ballintra, Ballyshannon, Tullyhase	Mail Coach	7	8	4	4	3	68½

(a) This Car is timed to suit the arrival and departure of the Steam Packets which ply between Killaloe and Shannon Harbour, a Boat is substituted for it during the summer months.

(b) Their opposition causes the low fare; each goes once per month from Ballycastle to Ballymoney.

(c) These run on Saturdays.

(d) Each Car twice each way daily.

(e) Commenced running 1st February, 1837.

Appendix B.
No. 5.
Public Conveyances.

COUNTY OF LONGFORD.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile Inside.	Fare per Mile Outside.	Distances in Irish Miles between Places in first Column.
						d.	d.	
Granard—Dublin	Castlepollard, Athboy, Trim, Clonee,	2 Coaches (a)	3	15	10	1¼	0⅔	59
Killashee—Roscommon	Lanesboro'	Car	6	6	4	–	2½	11
Longford—Boyle	Newtown-Forbes, Rusky, Carrick-on-Shannon	Car	6	8	4	–	1½	25¾
" Mullingar	Edgeworthstown, Rathowen	Car (b)	7	10	7	–	1¼	21½
" Strokestown	------	Mail Car	7	3	1	–	2¼	11½
Toomebridge—Athlone	Ballymabon, Ballykerrin	Car (c)	7	8	5	–	1½	10
COUNTY OF LOUTH.								
						d.	d.	
Drogheda—Dublin	Julianstown, Balbriggan, Swords	Coach	6	15	12	3	2½	23
" Dublin	Julianstown, Balbriggan, Swords	Caravan	6	16	12	1½	–	23
" Dublin	Julianstown, Balbriggan, Swords	Mail Car	7	6	4	–	1¾	23
" Dublin	Ashbourne,	Car	6	14	10	–	2	23
" Louth	Collon, Ardee	Mail Car	7	4	2	–	1¾	–
" Navan	Slane	Mail Car	7	4	3	–	2	12
Dundalk—Carrickmacross	Louth	Mail Car	7	4	2	–	2½	11
" Castlebluney	------	Caravan	6	16	6	2	–	12¼
" Newry	Flurrybridge	2 Caravans	6	16	12	2½	–	9½
COUNTY OF MAYO.								
						d.	d.	
Ballaghaderin—Frenchpark	------	Mail Car	7	6	2	–	2¼	6
Ballina—Crossmolina	------	Mail Car	7	6	2	–	2	6
" Killala	------	Mail Car	7	6	3	–	2	6
" Swinford	Foxford	Mail Car	7	4	2	–	1¾	14
Ballinrobe—Tuam	------	Car	7	4	3	–	1½	17½
Castlebar—Sligo	Ballina, Ballisodare	Mail Coach (d)	7	8	4	3	2	–
Westport—Ballinasloe	Castlebar, Ballyglass, Hollymount, Tuam, Castleblakeney, Ahascaragh	Mail Coach	7	8	4	3¾	2½	62½
" Tuam	Castlebar, Ballyglass, Hollymount	Car	7	12	7	–	1¾	34
COUNTY OF MEATH.								
						d.	d.	
Athboy—Dublin	Trim, Clonee	Caravan	7	14	8	1½	–	37
Kells—Dublin	Navan, Dunshaughlin, Clonee	Coach	7	15	7	2½	1½	30
" Dublin	Navan, Dunshaughlin, Clonee	Car	7	16	10	–	1¼	30
Navan—Drogheda	Slane	Mail Car	7	4	3	–	2	12
" Dublin	Ashbourne	Coach	6	16	5	2	1	23
Slane—Dublin	------	Car	6	6	3	–	1½	22
Trim—Dublin	Clonee	Omnibus	3	14	10	1¼	–	25
" Dublin	Clonee	Car	3	6	4	–	1¾	25
" Kilcock	Summer-hill	Mail Car	7	4	2	–	1½	10
COUNTY OF MONAGHAN.								
						d.	d.	
Ballibay—Newry	Castleblaney, Newtownhamilton	Car	7	4	3	–	1½	21
Castleblaney—Dundalk	------	Caravan	6	16	6	2	–	14
Carrickmacross—Dundalk	Louth	Mail Car	7	4	2	–	2½	12
Clones—Dublin	Newbliss, Cootehill, Shercock, Kingscourt, Nobber, Navan, Dunshaughlin, Clonee	Coach	3	15	8	3	1¾	68
Monaghan—Armagh	Caledon, Glasslough	Mail Car	7	4	2	–	2	13
" Newry	Castleblaney, Newtownhamilton	Caravan	7	15	10	1½	–	28
QUEEN'S COUNTY.								
						d.	d.	
Maryborough—Abbeyleix	------	Car	–	–	–	–	1½	7
Mountrath—Dublin	Abbeyleix, Stradbally, Kilcullen, Naas, Rathcoole	Caravan	7	16	9	1¼	–	47
Mountmellick—Dublin	Portarlington, Monastereven, Kildare, Newbridge, Naas, Rathcoole	Caravan	3	10	4	–	–	40
" Kilkenny	Maryborough, Abbeyleix, Durrow, Ballyragget	Mail Car	7	12	8	–	2	30
" Kinnety	Clonaslie	Car (e)	7	6	3	–	1	15
" Mountrath	------	Car	7	6	4	–	1¼	9

(a) These Coaches run in the same direction, on the same days.

(b) Also a boat daily to and from Dublin, able to carry 70, and averaging 40 Passengers, at 1*d.* each.

(c) To meet the Boats on the Royal Canal.

(d) Returned as one Conveyance by the Post-office, but from the Constabulary Returns it appears to comprise two distinct Mails, one from Sligo to Ballina, the other from Castlebar to Ballina.

(e) To meet the Canal Boats.

Appendix B.
No. 5.
Public Conveyances.

COUNTY OF ROSCOMMON.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile. Inside.	Fare per Mile. Outside.	Distance in Irish Miles between Places in first Column
						d.	d.	
Athlone—Ballinasloe	~~~~	Car	6	4	2	–	1½	–
" Kilbeggan	Moate	Caravan	6	12	8	–	1¾	15½
" Mullingar	Ballykerrin, Ballymahon, Colehill, Ballinacargy	Mail Car	7	4	2	–	1¾	22½
" Toomebridge	Ballykerrin, Ballymahon	Car (a)	7	8	5	–	1¼	–
Boyle—Dublin	Carrick-on-Shannon, Drumsna, Newtown-Forbes, Longford, Edgeworthstown, Rathowen, Mullingar, Kinnegad, Clonard, Enfield, Kilcock, Maynooth, Lucan	Coach	3	15	9	3	2	85
" French Park	~~~~	Mail Car	7	6	3	–	2½	7
" Longford	Carrick-on-Shannon, Ruskey, Newtown-Forbes	Car	6	8	4	–	1½	25
French Park—Ballaghaderrin	~~~~	Mail Car	7	6	2	–	2½	6
Roscommon—Killashee	Lanesboro'	Car	6	6	4	–	1½	11
Strokestown—Longford	~~~~	Mail Car	7	3	1	–	2½	11
COUNTY OF SLIGO.								
						d.	d.	
Sligo—Ballinacarem	Ballisodare, Collooney	Car	2	6	4	–	2½	9
" Ballyshannon	Tullyhase	Car	6	6	3	–	2	21½
" Castlebar	Ballisodare, Ballina	Mail Coach (b)	7	8	4	3	2	44
" Enniskillen	Manor-Hamilton	Mail Car	7	6	4	–	2	32
" Dublin	Collooney, Boyle, Carrick-on-Shannon, Drumsna, Dromod, Newtown-Forbes, Longford, Edgeworthstown, Rathowen, Mullingar, Kinnegad, Clonard, Enfield, Kilcock, Maynooth, Lucan	Mail Coach	7	8	5	3	2	104
" Dublin	Collooney, Boyle, Carrick-on-Shannon, Drumsna, Dromod, Newtown-Forbes, Longford, Edgeworthstown, Rathowen, Mullingar, Kinnegad, Clonard, Enfield, Kilcock, Maynooth, Lucan	Coach	3	15	10	–	–	104
" Londonderry	Tullyhase, Ballyshannon, Ballintra, Donegal, Stranorlar, Strabane	Mail Coach	7	8	4	4	3	68
COUNTY OF TIPPERARY.								
						d.	d.	
Burros-a-kane—Parsonstown	~~~~	Car	6	6	3	–	2	11
Clogheen—Lismore	~~~~	Mail Car	7	4	1	–	2	9½
Clonmel—Dublin	Callan, Kilkenny, Royal Oak, Leighlinbridge, Carlow, Castledermot, Ballytore, Kilcullen, Naas, Rathcoole	Coach	3	15	11	3½	1¾	82
" Kilkenny	Callan	Car	3	6	4	–	2	24
" Limerick	Cahir, Tipperary	Mail Car	7	4	2	–	2	40
" Roscrea	Cashel, Thurles, Templemore	Car	6	8	4	–	2	–
" Thurles	Cashel	Car	6	12	8	–	2	–
" Waterford	Carrick-on-Suir, Pilltown	Car (c)	7	16	10	–	1¾	24
" Waterford	Carrick-on-Suir	Car	6	8	5	–	1½	24
Nenagh—Burros-a-kane	~~~~	Car	6	6	2	–	1¾	8
" Limerick	~~~~	Coach	6	15	10	–	–	20
" Roscrea	Moneygall, Drumkern	Car	6	6	4	–	1¾	16
Newport—Limerick	Castleconnell	Car	6	10	6	–	1	8½
Roscrea—Ballinasloe	Parsonstown, Banagher, Eyrecourt	Mail Car	7	6	3	–	2¼	30
" Dublin	Maryborough, Monastereven, Kildare, Newbridge, Naas, Rathcoole	Caravan	6	16	9	2	–	59
" Portumna	Shinrone, Cloughjordan, Burros-a-kane	Mail Car	7	6	2	–	2	16½
Thurles—Dublin	Templemore, Rathdowney, Mountrath, Maryborough, Ballybrittas, Monastereven, Kildare, Newbridge, Naas, Rathcoole	Coach	3	15	9	2¾	1⅔	75
Killenaule	Littleton	Mail Car	7	4	1	–	2	9¼
" Kilkenny	Littleton, Urlington, Johnstown, Freshford	Mail Car	7	4	3	–	2	25
" Roscrea	Templemore	Mail Car	7	6	4	–	2	15¾
Tipperary—Cashel	~~~~	Car	6	6	2	–	2	9½
" Cork	Mitchelstown	Coach	3	12	5	5	5	42
" Limerick	~~~~	2 Cars	6	6	5	–	1	19

(a) To meet the Boats on the Royal Canal.

(b) Returned as one Conveyance by the Post Office; but, from the Constabulary returns, it appears to comprise two distinct Mails, one from Sligo to Ballina, the other from Castlebar to Ballina.

(c) Of 22,062 passengers conveyed by one of these Cars in the years 1835 and 1836, 4,905 were from Waterford to Carrick—1,767 from Waterford to Clonmel—1,809 from Clonmel to Carrick—1,257 from Clonmel to Waterford—4,045 from Carrick to Waterford; the remainder to Pilltown and Villages on the road.

Appendix B.
No. 5.

Public Conveyances.

COUNTY OF TYRONE.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile.		Distance in Irish Miles between Places in first Column.
						Inside.	Outside.	
						d.	d.	
Aughnacloy—Armagh	Caledon	Car	6	6	3	–	1½	–
Caledon—Armagh	——	Car	7	6	4	–	1½	–
Clogher—Armagh	Caledon, Aughnacloy	Car	6	6	4	–	1½	19½
„ Enniskillen	——	Mail Car	7	6	4	–	1½	19½
„ Enniskillen	——	Car	6	6	4	–	1½	19½
Cookstown—Belfast	Moneymore, Magherafelt, Castledawson Toome, Randalstown, Antrim	Coach	6	16	11	2½	2	37
Dungannon—Armagh	Moy, Charlemont	Caravan	2	10	7	1½	–	11
„ Armagh	Moy, Charlemont	7 Cars	1	6	4	–	1½	11
„ Belfast	Moy, Portadown, Lurgan, Moira, Lisburn	Coach	3	16	10	2¼	1¾	35
„ Dublin	Moy, Charlemont, Armagh, Markethill, Newry. Dundalk, Dunleer, Drogheda, Ashbourne	Coach	3	15	7	3½	1¾	76
„ Portadown	Charlemont	Coach	3	16	6	4	2½	12½
Omagh—Dublin	Ballygawley, Aughnacloy, Emyvale, Monaghan, Castleblaney, Carrickmacross, Drumcondra, Slane, Ashbourne	Coach	3	15	8	5	3	86
„ Londonderry	Newtown-Stewart, Strabane	Coach	6	16	10	2	1¾	26
Stewartstown—Armagh	Moy	Caravan	1	10	6	2	–	–
Strabane—Castlederg	——	Mail Car	7	4	3	–	1½	8
„ Ramelton	Letterkenny, Lifford	Mail Car	7	4	3	–	2¼	20

COUNTY OF WATERFORD.

						d.	d.	
Carrick-on-Suir—Kilkenny	Kilmaganny, Kells	Car	6	6	3	–	2½	22
Dungarvan—Youghal	Clashmore	Car	6	6	4	–	2	18
Lismore—Clogheen	——	Mail Car	7	4	1	–	2	9½
Waterford—Clonmel	Pilltown, Carrick-on-Suir	2 Cars (a)	6	16	10	1¾	–	–
„ Clonmel	Carrick-on-Suir	Cars	7	8	5	–	1¾	–
„ Cork	Kilmacthomas, Dungarvan, Cappoquin, Lismore, Tallow, Youghal, Killeagh, Middleton	Mail Coach	7	8	3	4¼	2¼	71½
„ Dublin	Thomastown, Gowran, Royal Oak, Leighlinbridge, Carlow, Castledermot, Ballytore, Kilcullen, Naas, Rathcoole	Mail Coach	7	8	4	4	2	75
„ Dublin	Thomastown, Gowran, Royal Oak, Leighlinbridge, Carlow, Castledermot, Ballytore, Kilcullen, Naas, Rathcoole	Coach	3	15	11	3½	1¾	75
„ Dungarvan	Kilmacthomas	Car	6	6	4	–	1¾	–
„ Enniscorthy	New Ross	Car	6	8	4	–	1¾	27
„ Kilkenny	Mullinavah, Stoneyford, Knocktopher	Coach	3	15	10	5¼	2¾	25¾
„ Limerick	Pilltown, Carrick-on-Suir, Clonmel, Cahir, Tipperary	Mail Coach	7	8	3	3¾	2	64
„ Limerick	Carrick-on-Suir, Clonmel, Cahir, Tipperary	Car	6	10	6	3¾	2	64
„ Lismore	Cappoquin	Car	6	6	3	–	2	–
„ Roscrea	Clonmel, Cashel, Thurles, Templemore	Mail Car	6	8	4	–	2	56
„ Thurles	Pilltown, Carrick-on-Suir, Clonmel, Cashel	Car	6	12	8	–	2	61
„ Wexford	Ballinabola, New Ross	Mail Coach	7	8	3	4	3	38
„ Youghal	Kilmacthomas, Dungarvan, Clashmore	Mail Coach	7	8	2	4¼	3	–

COUNTY OF WESTMEATH.

						d.	d.	
Kilbeggan—Athlone	Moate	Caravan	6	12	8	–	1¾	15½
„ Banagher	Kilbeggan, Clara, Ballycumber	Mail Car	7	4	2	–	2½	20¼
Mullingar—Athlone	Ballinacargy, Colehill, Ballymahon, Ballykeerin	Mail Car	7	4	2	–	1¾	22¾
„ Dublin	Kinnegad, Clonard, Enfield, Kilcock, Maynooth, Lucan	Coach	3	15	9	3	2	38
„ Longford	Rathowen, Edgeworthstown	Car	7	10	7	–	1¼	20¾
„ Parsonstown	Kilbeggan, Tullamore, Kinnety	Mail Car	7	6	2	–	2	33¾
„ Parsonstown	Kilbeggan, Tullamore, Frankford, Kinnety	Car	7	6	2	–	2¼	33¾

(a) Of 22,062 Passengers conveyed by one of these Cars in the years 1835 and 1836, 4,905 were from Waterford to Carrick—1,767 from Waterford to Clonmel—1,809 from Clonmel to Carrick—1,257 from Clonmel to Waterford—4,045 from Carrick to Waterford, the remainder to Pilltown and Villages on the road.

Appendix B.
No. 5.

Public Conveyances.

COUNTY OF WEXFORD.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile. Inside.	Fare per Mile. Outside.	Distance in Irish Miles between Places in first Colum
						d.	*d.*	
Enniscorthy—Dublin	Gorey, Arklow, Rathdrum, Newtown-Mt.-Kennedy, Bray	Coach	3	15	9	3	2	62
„ New Ross	Clonroche	Mail Car	7	4	2	–	2	15
„ Newtownbarry	〰	Car	6	6	3	–	2	10
„ Waterford	New Ross	Car	6	8	4	–	1¾	27
New Ross—Carlow	Graigue, Borris, Goresbridge, Bagnalstown, Leighlinbridge	Car	3	6	3	–	2½	27
„ Fethard	Duncannon, Arthurstown	Mail Car	7	4	3	–	2½	13
„ Thomastown	Innistiogue	Mail Car ([a])	7	4	3	–	2½	12
Wexford—Bannow	〰	Car	2	6	4	–	2	20
„ Bridgestown	〰	Car	2	6	3	–	1¼	9
„ Churchtown	〰	Car	2	6	3	–	1½	13½
„ Dublin	Enniscorthy, Ferns, Camolin, Gorey, Arklow, Rathdrum, Ashford, Newtown-Mt.-Kennedy, Delgany, Bray	Mail Coach	7	8	4	3½	2½	74
„ Dublin	Enniscorthy, Ferns, Camolin, Gorey, Arklow, Rathdrum, Ashford, Newtown-Mt.-Kennedy, Delgany, Bray	Coach	6	15	9	3	2	74
„ Dublin	Wexford, Enniscorthy, Tallow, Baltinglass	Coach	6	15	8	2¼	1⅔	74
„ Duncormick	〰	2 Cars	2	6	3	–	1½	13½
„ Enniscorthy	Oylegate	Car	6	10	5	–	1½	14
„ Enniscorthy	Oylegate	Car	6	8	4	–	1½	14
„ Enniscorthy	Oylegate	2 Cars	6	6	3	–	1½	14
„ Killmore	〰	2 Cars	2	6	3	–	1¼	11
„ New Ross	Taghmore	Mail Car	7	6	4	–	2½	23
„ Taghmore	〰	2 Cars	3	6	4	–	1	9
„ Waterford	New Ross, Ballinabola	Mail Coach	7	8	3	4	3	38

COUNTY OF WICKLOW.

Towns between which Conveyances run.	Towns or Villages through which Conveyances pass.	Description of Conveyance.	Times per Week each passes in one direction.	Number of Passengers each can carry.	Average Number carried.	Fare per Mile. Inside.	Fare per Mile. Outside.	Distance in Irish Miles between Places in first Colum
						d.	*d.*	
Arklow—Dublin	Rathdrum, Newtown-Mount-Kennedy, Bray	Car	6	6	3	–	1½	40
Bray—Dublin	〰	Omnibus	7	9	5	1¾	–	10
„ Kingstown	〰	Omnibus ([b])	21	13	13	2	–	6
„ Kingstown	〰	Omnibus	12	13	10	1½	–	6
„ Kingstown	〰	2 Cars	14	6	3	–	1½	6
Delgany—Kingstown	Bray	Car	6	6	3	–	1½	–
Wicklow—Dublin	Newtown-Mount-Kennedy, Bray	2 Caravans	6	16	12	1	¾	24

[a] Meets Dublin Mail at Thomastown.
[b] Runs three times a-day in Winter, and four times in Summer, to meet the Kingstown Railway.

Appendix B.
No. 5.
Public Conveyances.

GENERAL POST OFFICE.

A RETURN of the NUMBER OF PASSENGERS conveyed by the MAIL COACHES IN IRELAND, during the Years 1834 and 1835.

Name of Mail.	Number of Passengers.	
	1834.	1835.
Dublin and Belfast	4,305	4,457
,, – Cork by Clonmel	3,899	3,458
,, – Cork by Cashel	3,129	3,584
,, – Derry	3,049	2,746
,, – Enniskillen	3,240	2,804
,, – Galway	3,584	3.206
,, – Kilkenny (a)	–	2,252
,, – Kingstown (b)	5,862	1,215
,, – Limerick	3,809	3,678
,, – Sligo	3,372	3,856
,, – Waterford	3,191	3,168
,, – Wexford	2,584	2,840
Ballinasloe and Westport	2,975	2,163
Belfast and Derry	2,622	3,057
,, – Enniskillen	2,846	3,156
Cork and Bantry	3,397	3,220
,, – Kinsale	3,254	2,871
,, – Tralee	2,058	2,926
Derry and Sligo	3,088	3,154
Enniskillen and Ballyshannon	1,668	2,315
Galway and Tuam	1,137	2,054
Limerick and Cork	3,494	3,344
,, – Galway	1,955	2,009
,, – Tralee (c)	–	2,696
Newry and Coleraine	2,014	1,569
Sligo and Castlebar	2,267	3,107
Waterford and Cork	1,800	2,078
,, – Dunmore (d)	1,133	938
,, – Dunmore and Limerick (e)	–	508
,, – Wexford (f)	–	1,521
,, – Youghal	1,690	1,611

This Return has been extracted from the different Irish Mail Coach Time Bills, and is as accurate an Account of the Number of Passengers conveyed during the years 1834 and 1835, as can be given from the General Post Office.

GEORGE LOUIS, *Surveyor and Superintendent.*

(a) Commenced May 6, 1835.

(b) Railway from April 5th, 1835.

(c) Commenced 5th January, 1835.

(d) Joined to Waterford and Limerick, 5th October, 1835.

(e) Commenced October 5th, 1835.

(f) Commenced May 18th, 1835.

RETURN of the NUMBER of PASSENGERS who travelled by the COACHES

PLACES OF DEPARTURE, &c.	Total Number of Miles.	Average Number of Passengers up & down.	Fares. Inside.	Fares. Outside.	First Town passed through.	Number of Miles.	Average Number of Passengers up & down.	Fares. Inside.	Fares. Outside.	Second Town passed through.	Number of Miles.	Average Number of Passengers up & down.	Fares. Inside.	Fares. Outside.
			s. d.	s. d.				s. d.	s. d.				s. d.	s. d.
Dublin to Belfast, Day Mail -	102¼	8,004	27 6	15 0	Drogheda -	29	7,929	7 6	5 0	Dundalk -	22¾	7,794	14 0	8 0
„ Belfast, Night Mail -	101	4,206	32 6	20 0	Drogheda -	29	4,212	9 6	6 6	Dundalk -	21½	4,119	17 6	11 0
„ Belfast, Fair Trader -	101	7,749	27 6	10 0	Drogheda -	29	7,890	7 6	5 0	Dundalk -	21½	7,966	14 0	8 0
„ Carlow - - -	50	4,802	10 0	5 0	Naas - -	20	5,085	6 0	3 6	Carlow -	29	3,192		
„ Clonmel - - -	104½	3,222	23 0	11 0	Naas - -	20	3,294	6 0	3 6	Carlow -	29	6,069	13 0	7 0
„ Cork, Day - -	160½	4,242	40 0	20 0	Naas - -	20½	4,215	6 6	4 0	Cashel -	80	3,156	30 0	15 0
„ Cork, Night - -	157½	3,735	45 0	20 0	Naas - -	20½	3,732	6 6	4 0	Carlow -	29	3,558	15 0	9 0
„ Dungannon - -	95½	6,744	25 0	13 0	Drogheda -	29	6,867	7 6	5 0	Dundalk -	21½	6,237	13 0	7 0
„ Enniscorthy - -	79	2,532	12 0	8 0	Gorey - -	61	1,728	10 0	6 0	Enniscorthy	18	1,134		
„ Kilcullen - - -	26¾	4,923	2 6	2 0	Naas - -	20	3,024	1 6	1 0	Kilcullen -	6¾	3,129		
„ Kilkenny - - -	75½	3,783	13 0	8 0	Baltinglass -	37	3,621	9 0	6 0	Carlow -	13	3,510	10 6	7 0
„ Kilkenny, Day - -	72¾	4,893	13 0	6 6	Ballytore -	36¾	4,242	7 6	4 0	Carlow, -	13½	3,825	10 0	5 0
„ Kilkenny, by Castlecomer	70	3,906	13 0	6 6	Naas - -	20	4,140	6 0	3 6	Castlecomer	38½	2,913	10 0	5 0
„ Londonderry - -	136½	3,096	45 0	25 0	Slane - -	28	3,152	9 0	5 6	Carrickmacross	22¾	2,838	18 6	9 0
„ Newry - - -	63½	3,594	15 0	8 0	Drogheda -	29	3,366	6 0	4 0	Dundalk -	21½	2,328	12 0	6 0
„ Newtownbarry - -	61	3,240	12 6	8 0	Baltinglass -	34	2,094	7 6	5 0	Tullow -	12	1,623	9 0	6 0
„ Omagh - - -	120	4,548	25 0	13 0	Carrickmacross	63	3,720	15 0	9 6	Omagh -	57	1,914		
„ Waterford, Night -	97½	3,681	30 0	15 0	Naas - -	20	2,564	6 6	4 0	Carlow -	29	3,279	15 0	-
„ Waterford, Day -	104½	3,588	25 0	12 0	Naas - -	20½	3,596	6 0	3 6	Carlow -	29	3,604	13 0	7 0
„ Wexford - - -	94	2,943	20 0	12 0	Rathdrum -	38	3,042	9 0	5 0	Arklow -	11½	2,670	13 0	7 6
„ Wexford, by Tullow -	87	2,847	15 0	10 0	Baltinglass -	34	2,796	7 6	5 0	Tullow -	12	2,097	9 0	6 0
„ Wexford, by Gorey -	94	3,192	15 0	10 0	Rathdrum -	38	3,252	6 0	4 6	Arklow -	12½	2,808	7 6	5 0
„ Wicklow - - -	32	7,911	2 6	2 0	Wicklow -	32	3,822							
Limerick to Clonmel - - -	48	927	-	7 0	Tipperary -	20	897	-	3 6	Clonmel -	18	1,059		
Waterford to Cork, Day - -	93	2,016	20 0	10 0	Cork - -	93	1,866							
„ Cork, Night - -	82	1,902	22 6	12 6	Dungarvan -	28	1,734	7 6	4 6	Cork - -	54	1,896		
„ Limerick - - -	77	1,770	20 0	10 6	Waterford -	77	1,299							

RETURN of the NUMBER of PASSENGERS who travelled by BIANCONI'S CARS and COACHES

PLACES OF DEPARTURE, &c.	Total Number of Miles.	Average Number of Passengers up & down.	Fare.	First Town passed through.	Fare.	Number of Miles.	Average Number of Passengers up & down.	Second Town passed through.	Fare.	Number of Miles.	Average Number of Passengers up & down.
			s. d.		s. d.				s. d.		
Boyle to Longford - -	33	—	—	Carrick-on-Shannon	1 6	9½	1,912	Jamestown	1 0		—
Limerick to Cork - -	63½	—	9 6	Bruff - - - - -	2 0	15	2,805	Kilmallock	2 0	15	2,953
„ Killarney - -	78¼	—	10 6	Adare - - - -	1 6	10	2,719	Rathkeale	1 6	7	2,719
„ Listowel - -	68¼	—	9 6	Askeaton - - -	2 0	17¾	—	Foynes -	1 6	7½	259
Mallow to Mitchelstown -	19½	—	3 6	Mitchelstown - -	1 0	19¼	984	Doneraile	1 0		530
Middleton to Rathcormack -	20½	—	—	Castle-Martyr - -	1 0	6½	—	Rathcormack	—	14	—
Roscrea to Ballinasloe -	39¼	—	6 0	Parsonstown - -	2 0	11½	851	Banagher	3 0	8¾	868
Roscrea to Waterford -	84¼	—	—	Templemore - -	1 6	12¾	1,979	Thurles -	1 6	10	2,164
Waterford to Cork - -	86¾	14,375	11 6	Carrick-on-Suir -	2 0	16¼	14,375	Clonmel -	1 6	13	9,955
„ Enniscorthy -	33	—	5 0	Ross - - - - -	2 0	14	8,749	Enniscorthy	—	15	2,059
„ Kilkenny (*) -	32	—	4 0	Ballyhale - - -	2 6	17½	5,839	Knocktopher	2 0	2	—
„ Limerick - -	78	14,375	10 6	Carrick-on-Suir, -	2 0	16½	14,375	Clonmel -	1 6	13	9,955
„ Lismore - -	42¾	—	6 0	Kilmacthomas - -	2 0	15	2,990	Dungarvan	1 6	12¾	3,057
„ Thurles - -	58¼	14,375	8 0	Carrick-on-Suir -	1 6	16¾	13,479	Clonmel -	2 0	13	13,479
„ Tipperary - -	59½	14,375	8 0	Carrick-on-Suir -	1 6	16¾	13,479	Clonmel -	1 6	13	13,479
„ Wexford - -	37½	—	6 0	Ross - - - - -	2 0	14	8,749	Wexford -	—	24½	1,723
Wexford to Thomastown -	38	—	—	Ross - - - - -	1 6	24½	1,723	Inistiogue	1 0	8	—

(*) Coach leaves Kilkenny to Dublin every morning.

connected with the Establishment of Messrs. PURCELL & Co., during the Year 1835.

Third Town passed through.	Number of Miles.	Average Number of Passengers up & down.	Fares.		Fourth Town passed through.	Number of Miles.	Average Number of Passengers up & down	Fares.		Fifth Town passed through.	Number of Miles.	Average Number of Passengers up & down	Fares.		Sixth Town passed through.	Number of Miles.	Average Number of Passengers up & down.	Fares.	
			Inside.	Outside.				Inside.	Outside.				Inside.	Outside.				Inside.	Outside.
			s. d.	s. d.				s. d.	s. d.				s. d.	s. d				s. d.	s. d.
Newry -	13	6,636	17 6	10 0	Hillsborough	25½	6,123	23 0	14 0	Belfast -	13	6,024							
Newry -	13	3,762	22 0	14 0	Hillsborough	25	3,255	30 0	17 6	Belfast -	13	2,922							
Newry -	13	7,704	17 6	10 0	Lisburn -	30	7,443	27 6	15 0	Belfast -	8	6,978							
Kilkenny -	23	1,728	13 0	8 0	Clonmel	32	1,860												
Mitchelstown	26	1,752	27 0	18 0	Fermoy -	10	3,303	40 0	20 0	Cork -	22	3,258							
Kilkenny -	20½	3,522	20 0	12 0	Clonmel -	32	3,897	30 0	16 0	Fermoy -	3½	4,011	43 0	2 0	Cork -	22	4,042		
Newry -	13	6,129	16 6	9 0	Armagh -	20	4,589	20 0	11 0	Dungannon	14	1,314							
Kilkenny -	25½	2,979																	
Kilkenny -	23	3,129																	
Kilkenny -	11½	2,382																	
Monaghan -	26½	2,616	26 0	14 0	Omagh -	33	3,078	35 0	19 0	Strabane -	15	3,180	42 0	22 6	Londonderry	11	3,336	45 0	25 0
Newry -	13	1,818																	
Newtownbarry	15	495																	
Thomastown	24½	2,979	25 0	12 6	Waterford	21½	2,940												
Kilkenny -	29½	3,040	15 0	8 0	Waterford	33	2,232												
Enniscorthy	29½	2,064	16 0	10 0	Wexford -	15½	1,848												
Enniscorthy	26	1,377	12 0	8 0	Wexford -	15	1,344												
Gorey -	10½	2,484	9 0	6 0	Enniscorthy	18	2,157	12 0	8 0	Wexford -	15	1,653							

through the South, South-east, and South-west of IRELAND, during the Year 1835.

Third Town passed through.	Fare.	Number of Miles.	Average Number of Passengers up & down.	Fourth Town passed through.	Fare.	Number of Miles.	Average Number of Passengers up & down	Fifth Town passed through.	Fare.	Number of Miles.	Average Number of Passengers up & down.	Sixth Town passed through.	Fare.	Number of Miles.	Average Number of Passengers up & down.
	s. d.				s. d.				s. d.				s. d.		
Ruskey -	1 6	12¾	—	Longford - -	—	18¾	3,644								
Kildorrery	2 0	12¾	2,979	Fermoy - -	3 6	8½	3,385	Cork -	—	22	6,146				
Newcastle	4 0	8	1,773	Castle Island	2 0	26½	1,474	Killarney	2 0	15	2,360	Tralee Branch	—	11½	4,212
Glynn - -	1 0	8½	259	Tarbert - -	1 6	3¾	1,276	Listowel	—	10					
Kildorrery	1 0		754												
Ballinasloe	—	18¾	702												
Cashel - -	1 3	14	4,171	Fethard - -	1 3	10	2,664	Clonmel	3 6	8½	2,011	Waterford -	—	29	14,375
Cahir - -	3 6	9¾	4,518	Mitchelstown	2 0	16	4,325	Fermoy	3 6	9½	6,146	Cork - - -	—	22	6,146
Kilkenny -	—	12½	3,589												
Cahir - -	2 0	9¾	4,265	Tipperary -	2 0	14	2,508	Landscape	2 0	12½	2,408	Limerick - -	—	12½	—
Cappoquin	1 0	11	—	Lismore - -	—	4	860								
Cashel -	1 6	15	4,171	Thurles - -	2 0	14	2,164								
Cahir - -	2 0	9¾	4,265	Tipperary -	3 0	20½	4,235								
Thomastown	—	5½	696												

Appendix B.
No. 5.
Public Conveyances.

RETURN of the NUMBER of PASSENGERS that travelled by the COACHES connected with the Establishment of Mr. GOSSON, 1835.

PLACES OF DEPARTURE.	Total No. of Miles.	Average No. of Passengers up and down.	Fares. Inside.	Fares. Outside.	First Town passed through.	No. of Miles.	No. of Passengers up and down.	Fares. Inside.	Fares. Outside.	Second Town passed through.	No. of Miles.	No. of Passengers up and down.	Fares. Inside.	Fares. Outside.	Third Town passed through.	No. of Miles.	No. of Passengers up and down.	Fares. Inside.	Fares. Outside.	Fourth Town passed through.	No. of Miles.	No. of Passengers up and down.	Fares. Inside.	Fares. Outside.	Fifth Town passed through.	No. of Miles.	No. of Passengers up and down.	Fares. Inside.	Fares. Outside.
			s.	s.				s. d.	s. d.				s. d.	s. d.				s. d.	s. d.				s. d.	s. d.				s. d.	s. d.
Cavan Day Coach, Sundays excepted,	50	6,852	10	7	Navan, -	23	6,120	5 0	3 0	Kells, -	32	5,724	6 0	4 0	Virginia, -	40	4,548	7 6	5 0	Cavan, -	50	4,296	10 0	7 0					
Drogheda Coach, Sundays excepted,	23	7,866	6	4	Swords, -	7	7,812	2 6	1 6	Balbriggan	15	7,536	5 0	3 0	Drogheda, -	23	7,152	6 0	4 0										
Drogheda Car, Sundays excepted,	22	4,824	–	3	Ashbourne,	10	4,452	–	1 6	Duleek, -	17	3,420	–	3 0	Drogheda, -														
Enniskillen Mail, every evening,	80	4,068	20	15	Navan, -	–	3,744	7 6	4 6	Kells, -	32	3,684	8 6	6 0	Virginia, -	40	3,684	10 0	7 6	Cavan, -	50	3,468	15 0	10 0	Enniskillen,	80	2,952	20 0	15 0
Kells Day Coach, Sundays excepted,	32	6,624	6	4	Navan, -	23	3,984	5 0	3 0	Kells, -	32	4,416	6 0	4 0															
Killeshandra, Granard, & Athboy Coaches,		11,894			Athboy, -	37	7,825	5 6	3 6	Oldcastle,	46	2,817	8 6	5 0	Killeshandra,	64	4,069	12 6	7 6	Killeshandra coach, down, Tues. Thurs. & Satur.; up, Mon. Wednes. & Frid. Granard do., down, Sun. Wednes. and Frid.; up, Tues. Thurs. and Saturday. The Athboy do., down and up every day.									
					Granard coach branches off to Castlepollard,						48	4,695	7 0	3 6	Granard, -	59	6,260	8 0	4 0										
Navan & Slane Coach, Sundays excepted,	22	7,848			Ashbourne,	10	7,716	2 6	1 6	Slane, -	22	1,896	5 0	3 0	Navan, -	22	4,176	5 0	3 0										

ABSTRACT showing the INCREASE and DECREASE in the Number of PASSENGERS conveyed between the undermentioned TOWNS by MR. GOSSON'S COACHES.

NAMES OF COACHES.	NAMES OF TOWNS.		Number of Passengers that started from Towns in First Column.	Number of Passengers that arrived at Towns in Second Column.	Increase or Decrease in Number of Passengers on the Road.	
	From	To			Increase.	Decrease.
Cavan Coach, - - -	Dublin. - -	Cavan, - -	3,216	2,124	–	1,092
	Cavan, - -	Dublin, - -	2,172	3,636	1,404	–
Drogheda Coach, - -	Dublin, - -	Drogheda, -	4,476	4,140	–	336
	Drogheda, -	Dublin, - -	3,012	3,420	408	–
Drogheda Car, - -	Dublin, - -	Drogheda, -	2,436	1,692	–	744
	Drogheda, -	Dublin, - -	1,692	2,388	696	–
Enniskillen Mail, - -	Dublin, - -	Enniskillen, -	1,980	1,704	–	276
	Enniskillen, -	Dublin, - -	1,248	1,968	720	–
Kells Day Coach, - -	Dublin, - -	Kells, - -	3,612	2,400	–	1,212
	Kells, - -	Dublin, - -	2,016	3,012	996	–
Killeshandra, Granard, and Athboy Coaches, - -	Dublin, - -	Killeshandra & Granard	5,940	5,006	–	934
	Killeshandra and Granard, -	Dublin, - -	4,543	5,020	477	–
Navan and Slane Coach, -	Dublin, - -	Navan and Slane	3,648	2,028 984	–	636
	Navan and Slane	Dublin, -	2,148 912	4,200	1,140	–

RETURN showing the NUMBER of PASSENGERS who travelled by the WATERFORD and CLONMEL ROYAL MAIL CAR and VAN, from WATERFORD to CLONMEL, and from CLONMEL to WATERFORD, as also from these TOWNS to the intermediate TOWNS and VILLAGES, as headed underneath, for Two Years, from 1st January, 1835 to 31st December, 1836.

This Return was furnished by Mr. THOMAS FAIRLIE, of Pilltown.

Places of Departure.	Distance.	No. of Passengers.	Places of Departure.	Distance.	No. of Passengers.
	Miles.			Miles.	
Waterford to Aghsh - -	4	578	Clonmel to Kilsheelan - -	4½	447
" Mooncoin - -	6	559	" Swinging Sign -	7¼	224
" Fiddown - -	8½	310	" Carrick - -	11¼	1,809
" Pilltown - -	10	920	" Pilltown - -	14¾	185
" Carrick - -	13	4,905	" Fiddown - -	16½	16
" Swinging Sign -	17½	102	" Mooncoin - -	18¾	19
" Kilsheelan - -	20¼	332	" Aghsh - - -	20¾	21
" Clonmel - -	24¾	1,767	" Waterford -	24¾	1,257
Pilltown to Clonmel - -	14¾	197	Carrick to Waterford - -	13	4,045
Carrick to Clonmel - -	11¾	3,036	Pilltown to Waterford - -	10	1,331
Total Number of Passengers	-	12,708	Total Number of Passengers	-	9,354

APPENDIX B.

No. 6.

RETURNS RELATING TO INLAND NAVIGATIONS IN IRELAND.

Appendix B.
No. 6.

Inland Navigations.

Grand Canal.

Description.

GRAND CANAL.

DESCRIPTION.—Extract from Report of Mr. Stokes, Engineer to the Grand Canal Company.

	Length of Canal. Miles.	Fur.	Per.	No. of Locks.
From the Liffey, at Ringsend Docks, to the town of Ballinasloe, . .	99	1	31	46
Branch from the Philipstown level, on the Shannon line, to the town of Kilbeggan,	8	1	9	0
Branch from the Philipstown level, to Edenderry, ...	1	0	0	0
Branch of old line from Lowtown, on the summit level, through the market towns of Rathangan, Monasterevan, and Athy, where it is connected by the Barrow Navigation, with the towns of Leighlinbridge and New Ross, and city of Waterford, ...	27	7	15	10
Branch from the Monasterevan level, to the towns of Portarlington and Mountmellick, ...	11	5	3	3
Branch to Milltown, as a Navigation, but forming the great supply to the summit level, 1½ mile from the Curragh of Kildare, and 2½ miles from Kildare,	5	0	29	0
Branch from the summit level to Blackwood, and the great bogs of Cusbela, Coolna, and Prosperous, and to the Reservoir, as a supply to the summit level, ...	3	6	21	0
Branch to the town of Naas and Corbally Harbour, 1½ mile from Kilcullen, and 1½ mile from Newbridge Barracks, ...	7	1	17	5
	164	0	5	64

The distances from leading places, or large towns, south and south-west of this extensive Navigation, are as follows:—viz., Kilcullen, 1½ mile; Ballitore, 5, Kildare, 2½, Maryboro', 5, Mountrath. 9; Kilkenny. 21; Clonmel, 46 miles, per road, but connected by the Navigation of the river Suir with the river Barrow, at Waterford, and thence, by Athy, to the Grand Canal and Dublin.

From the present termination of the Grand Canal, at Ballinasloe, the towns of Loughrea,—distance, 15 miles, Tuam, 22, and Galway, 31 miles, are in daily communication.

From the junction of the Grand Canal with the river Shannon, at Shannon Harbour, the Navigation may be said to exceed 100 miles on that river, from Lough Allen to the Port of Limerick, to which may be added 60 miles below that port to the sea.

Return relating to Passage Boats.

NAMES OF STAGES.	Distance from Dublin.	Average Time of performing the Journey by Fly Boat.		Average Time of performing the Journey by Night Boat		FARES. From Dublin to respective Stages. Night Boats. First Cabin		Night Boats. Second Cabin.		Fly Boats. First Cabin		Fly Boats. Second Cabin.		Number of Passengers that travelled by the Passage Boats, between Dublin and all other Towns and Stages, in the Year 1836. First Cabin.	Second Cabin.	Total.
	Stat. Miles.	H.	M.	H.	M.	s.	d.	s.	d.	s.	d.	s.	d.			
Dublin, - -	—	—		—		—		—		—		—		9,792	20,283	30,075
Hazle-Hatch, -	11	1	50	2	45	1	6	1	0	1	6	1	0	712	4,405	5,117
Sallins, - -	19	2	45	4	15	2	3	1	6	2	4	1	6	737	3,349	4,086
Robertstown, .	26	3	45	5	40	3	0	2	0	3	2	2	0	380	3,529	3,909
Ticknevin, - -	33½	4	35	7	10	3	9	2	6	—		—		125	987	1,112
Rathangan, - -	34½	4	55	—		3	9	2	6	3	9	2	6	505	1,079	1,584
Edenderry, - -	38	5	0	7	40	4	2	2	9	4	5	2	11	444	2,433	2,877
Ballybritain, - -	41	5	25	8	30	4	6	3	0	—		—		241	994	1,235
Monasterevan, -	41	5	55	—		4	6	3	0	4	6	3	0	736	2,488	3,224
Portarlington. -	46½	6	30	—		5	0	3	3	5	0	3	3	607	1,509	2,116
Vicarstown, - -	48	6	45	—		4	6	3	0	4	6	3	0	329	679	1,008
Philipstown, - -	49	6	15	10	0	5	3	3	6	5	9	3	8	524	1,902	2.426
Mountmellick, -	53	7	15	—		5	6	3	6	5	6	3	6	838	2,764	3,602
Athy, - - -	54½	7	35	—		4	6	3	0	4	6	3	0	959	2.748	3,707
Tullamore, - -	57½	7	35	11	50	6	0	4	0	6	8	4	4	1,804	4,781	6,585
Kilbeggan, - -	60	7	40	—		6	0	4	0	6	8	4	4	1,031	2,135	3,166
Cornmalor, - -	65	9	10	14	0	7	0	4	9	—		—		—	—	—
Gillen, - -	73½	10	10	15	20	8	0	5	6	—		—		390	1,183	1,573
Shannon Harbour,	79½	11	0	17	0	9	0	6	3	10	0	6	9	1,234	2,506	3,740
Clonfert, - -	—	—		—		—		—		—		—		286	340	626
Kylemore, - -	87	—		18	35	9	6	6	8	—		—		—	—	—
Ballinasloe, - -	99	—		19	45	10	0	7	0	—		—		1,950	2,646	4,596
														23,624	62,740	86,364

Return of the Number of Passengers conveyed to and from Dublin on the Grand Canal, distinguishing the First and Second Cabin Passengers, and also the Numbers conveyed by the Day Boats from those conveyed by the Night Boats.

Years.	Day Boats. First Cabin.	Day Boats. Second Cabin.	Day Boats. Total.	Night Boats. First Cabin.	Night Boats. Second Cabin.	Night Boats. Total.	Total Number of Passengers by Day and Night Boats.
1832	8,910	28,843	37,753	7,194	25,845	33,039	70,792
1833	6,200	21,652	27,852	5,396	21,566	26,962	54,814
1834	7,284	26,660	33,944	6,513	23,891	30,404	64,348
1835	6,951	23,861	30,812	9,217	32,719	41,936	72,748
1836	7,837	22,212	30,049	15,369	40,946	56,315	86,364
1837	9,614	26,624	36,238	17,311	47,146	64,457	100,695

(Signed) Richard Davis, *Collector, Portobello.*

Appendix B. No. 6.

Inland Navigations.

Grand Canal.

GRAND CANAL—(*continued.*)

RETURN of the Number of PASSENGERS that travelled by the PASSAGE BOATS on the GRAND CANAL, between Dublin and all other Towns and Stages, for the Year 1836.

Number of Passengers conveyed in one Year.

From	To Dublin.		To H. Hatch.		To Sallins.		To Robertstn.		To Ticknevin		To. Edender		To Ballybrit.		To Philipstn.		To Tullamore.		To Gillan.	
	1st Cabin	2nd Cabin	1st.	2nd.	1st.	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
Dublin, -	–	–	196	928½	376	1143½	255	956	99½	237	248½	728½	113	157	333	640½	1200	1490	283½	528½
Hazle-Hatch,	492	1270½	–	–	20	553½	4	471	2	172	2	165	–	86	5	322½	23½	652½	1	154½
Sallins, -	480½	1345	15	385½	–	–	16	625½	17	109½	13	125½	1	39½	15	115½	58	262½	11	46
Robertstown, -	165	966½	31	477½	4	798	–	–	4	167	4	182½	–	60½	14	116	68	146½	1	32
Ticknevin, -	78	258½	1	93½	17	113	9	209	–	–	6	199½	–	35½	1	48	10	24½	–	1
Edenderry, -	247½	875	3	135	13	174	12	240½	13	222	–	–	1	60	25	272	86½	305	6	18
Ballybritain,	168½	262	2	95½	3	72½	4	109	1	67	5	119	–	–	9	139½	40	105½	1	4
Philipstown, -	222½	634	1	165½	14	97½	10	160½	2	79	26	270	16	191½	–	–	130½	80½	2	18
Tullamore, -	1020½	1618½	25	261½	48½	290	36	269½	9	88	59	354	51	268	84	738½	–	–	72	281
Kilbeggan, -	918½	1498½	15	112½	26	103½	30	185½	–	–	34	147	8	88½	–	–	–	–	–	–
Gillan, - -	307	546½	7	38	2	57	4	28	1	11	8	30	–	21	3	40	29	278½	–	–
Shan. Harbour,	918	1630½	36½	52	10	60	13	50	7	10	8	13	5	7	10	12	99½	248½	21	45
Clonfert, -	206	116	4	1	–	5	1	7	–	–	–	–	–	–	1	1	2	9	2	2
Ballinasloe -	1628½	1830½	20	80	42½	67½	20	73	3	10	4	3	3	7	2	11½	72½	151½	23	42
Rathangan, -	319	374	3	37	7	48	9	153½	–	–	–	–	–	–	–	–	–	–	–	–
Monasterevan,	240½	305	9	64	20	129½	27½	201	–	–	–	–	–	–	–	–	–	–	–	–
Portarlington,	487	532½	15½	17	13	14	6	36	–	–	–	–	–	–	–	–	–	–	–	–
Mountmellick,	723½	1879	4	33½	2½	46	9	60	–	–	–	–	–	–	–	–	–	–	–	–
Vicarstown, -	284½	423½	–	1	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–
Athy, - -	736	1974	6	12	1	6	2	28	–	–	–	–	–	–	–	–	–	–	–	–

From	To Sh. Harb.		To Clonfert.		To Ballinasloe.		To Rathangn.		To Monastrn.		To Portarltn.		To Athy.		To Vicarstn.		To Mt.mellick		To Kilbeggan	
	1st	2nd	1st.	2nd	1st	2nd.	1st.	2nd	1st.	2nd	1st.	2nd	1st	2nd.	1st	2nd	1st.	2nd.	1st	2nd
Dublin, -	744	2033½	268½	181	1416½	2185	347½	424½	380	585½	526½	634½	734½	2240	295½	523	815	2552½	1160½	2115½
Hazle-Hatch,	110½	306	–	41	5	82	8	55	18	55	10	12	–	–	–	–	3	19	9	185½
Sallins, - -	8½	57½	4	4	30½	46	–	–	9	86½	8	16	–	–	–	–	11	21½	34½	65
Robertstown, -	6	17	2	4½	17½	38½	29	187½	10	158	6	33	–	–	–	–	6	52½	13	93½
Ticknevin, -	–	–	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	2	14
Edenderry, -	2	8	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	35	123½
Ballybritain,	1	4	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	7	59
Philipstown, -	2	15	1	–	3	17	–	–	–	–	–	–	–	–	–	–	–	–	94	374
Tullamore, -	247	179	18	13	130	111	–	–	–	–	–	–	–	–	–	–	–	–	4	7½
Kilbeggan, -	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Gillan, - -	10	61	4	8	15	64½	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Shan. Harbour,	–	–	3	43½	103½	335	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Clonfert, -	23	58	–	–	47	141	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Ballinasloe, -	110½	306	21	84½	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Rathangan, -	–	–	–	–	–	–	–	–	96	371	16½	42	–	–	–	6	54½	48	–	–
Monasterevan.	–	–	–	–	–	–	84½	367	–	–	27	279	234	715½	53	167	41	261	–	–
Portarlington,	–	–	–	–	–	–	8	29	29	210	–	–	–	–	–	2	49	668	–	–
Mountmellick,	–	–	–	–	–	–	36	57	35	225	29½	462½	–	–	–	2	–	–	–	–
Vicarstown, -	–	–	–	–	–	–	1	–	21	175½	–	–	22	77	–	–	–	1	–	–
Athy, - -	–	–	–	–	–	–	1½	2	169	617½	–	–	–	–	44	109	–	–	–	–

COMPARATIVE VIEW of the FORMER and PRESENT RATES of FARES for the Conveyance of PASSENGERS on the GRAND CANAL.

Former and Present Rates of Fares.

Names of Stages.	Distances from Dublin.	Fares in 1807.					Fares in 1830.				Present Fares.			
		First Cabin.			Second Cabin.		First Cabin.		Second Cabin.		First Cabin.		Second Cabin.	
	Miles.	£	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Monasterevan - -	41	0	10	0	6	2	5	6	3	3	4	6	3	0
Athy - - -	54½	0	10	9	6	8	5	6	3	3	4	6	3	0
Tullamore - -	57	0	16	4	10	0	9	2	4	9	6	0	4	0
Shannon Harbour -	79½	1	1	0	13	0	12	0	6	6	9	0	6	3
Ballinasloe - -	94	–			–		14	0	8	0	10	0	7	0

ANDREW BAGOT, *Inspector of Passage Boats.*

REMARKS.—The Swift Passage Boats were established in June, 1835, when the Fares were considerably reduced. They are generally 60 feet in length and 6 feet in breadth, and are designed to accommodate 20 first-cabin, and 32 second-cabin passengers, together with the master and crew, though not unfrequently they carry a larger number, and travel at the rate of 10 British miles an hour, between locks. Two of these boats leave Dublin every morning; one at 7 o'clock, for Kilbeggan, Tullamore, and Shannon Harbour, and the other at half-past 7 o'clock, for Mountmellick and Athy, from each of which places a boat arrives in Dublin every afternoon about half-past 4 o'clock.

The night boats, 60 feet long and 8 feet broad, are designed to carry 45 first-cabin and 35 second-cabin passengers, and to travel at the rate of 6 British miles an hour. One of these boats leaves Dublin each afternoon, at 2 o'clock, for Ballinasloe, from which place a boat arrives in Dublin every morning about half-past 10 o'clock.

The Fares are, on an average, less than 1½*d.* per British mile for first-cabin and 1*d.* per British mile for second-cabin passengers. The allowance of luggage, free of charge, for first-cabin passengers, 84 lbs., but not to exceed 1 cwt. in the whole; and for second-cabin passengers, 42 lbs., but not more than ½ cwt. in the whole.—Charge for extra luggage, ¼*d.* per lb. per stage, but not to exceed 1½*d.* per lb. any distance.

The Shannon Navigation Company's Steamers, to and from Limerick, ply in connexion with the passage boats: fare, by boat and steamer, *from Dublin to Limerick*, as follows:—night boat, first cabin, 13*s.* 6*d.*, second cabin, 9*s.* 6*d.*—Day boat, first cabin, 14*s.* 6*d.*; second cabin, 10*s.* Passengers for Limerick, &c., can proceed by the day boat, at 7 o'clock in the morning, and sleep either at Tullamore or Shannon Harbour; or, by the day boat at 2 o'clock, meeting the steamer at Shannon Harbour the following morning. Passengers, to and from the passage boats, *carried free* by the steamer, between Banagher and Shannon Harbour. Steamers on the Lower Shannon sail regularly from Limerick for Clare, Ennis, and Kilrush.

Caravans and jaunting cars ply in connexion with the passage boats, as follows:—At Edenderry, Portarlington, Mountmellick, and Vicarstown—to and from the boat, free of charge.—At Mountmellick—to Mountrath, 3*d.*, Maryborough, 6*d.*, and Abbeyleix, 1*s.*—At Athy—to Carlow, fare, inside, 9*d.*, outside, 6*d.*—At Kilbeggan—to Moate, fare, inside, 1*s.* 4*d.*; outside, 10*d.*—To Athlone—inside, 2*s.*; outside, 1*s.* 6*d.*—At Tullamore—to all parts of the surrounding country, at moderate rates.

Small parcels are conveyed by cars, at rates not exceeding 3*d.* each, in addition to the boat charge of 6*d.*

Parcels are carried between Dublin and all parts of the country connected with this Navigation, in both day and night boats, and the owners of trading boats have the privilege of forwarding, free of charge, samples of corn, &c., &c., to the Dublin market; and many persons connected with the trade and the Company, numerous artificers, employed by the Company, and materials for repair of their works, and all persons of the Police establishment, stationed at or near the canal or its branches, are permitted to pass free along the line; by which regulations the Passage boats are rendered an important auxiliary to an extensive trade, affording the means of maintaining and protecting the works, and of preserving the peace throughout a considerable district of country.

Appendix B. No. 6.

Inland Navigations.

Grand Canal.

Trade Boats.

GRAND CANAL—(*continued.*)

RETURN relating to TRADE BOATS.

TIME CONSUMED BY TRADE BOATS BETWEEN DIFFERENT PLACES.							
PLACES.		Distances.	TIME.			Tonnage of Boats.	Draft of Water when laden.
			By Day only.		By Day and Night		
From	To	Stat Miles	Days	Horses.	Hours.		
Dublin,	Monastrvn.	40	2	2	–	From 30 Tons to 70 Tons.	4 feet 6 inches in dry seasons, limited to 4 feet 3 inches passing summit level.
do.	Mt.mellick,	52	2½	2	–		
do.	Carlow,	66	3	1	–		
do.	Kilbeggan,	59	2	2	30		
do.	Tullamore,	56	2	2	30		
do.	Shan.Harb.	78½	–	–	44		
do.	Ballinasloe,	93	–	–	52		
do.	Limerick,	132	–	–	84		

REMARKS.—A large proportion of the trade of the Canal, particularly in the weightier articles, is carried on by Boats, each drawn by one horse. The extensive Boat Proprietors who are engaged in the carrying trade, have established regular periodical voyages, and their Boats leave Dublin, for the principal stations, three times a week, some in the morning, others in the afternoon—the former travelling generally by day only, the latter by day and night uninterruptedly throughout the line, according to established regulations, and in like manner return to Dublin. Boats which meet with occasional impediments during the day trips, travel by night, in order to make up for the time lost, and to maintain punctuality of arrival at their respective destinations. In all cases of urgency, Day Boats can travel by night, and stables have been established at several places along the line, by the Boat owners, where relays of horses are provided. This system has been much improved within the last few years, but is still capable of very considerable further improvements for increasing the speed of the Boats, which the natural competition of an improving commerce will, no doubt, gradually effect.

The connexion of the Canal with the rivers Barrow and Shannon forms two very important features in the Navigation. The Barrow, having trackways, affords facility for extending the trade by horses, through a fine agricultural country, and the introduction of steam power on the Shannon is calculated to lead to similar beneficial improvements.

Tonnage, and Amount of Toll.

RETURN of the TONNAGE of all COMMODITIES conveyed upon the GRAND CANAL, to and from Dublin, and the AMOUNT of TOLL paid thereon—commencing with the Year 1822.

Years.	Flour.	Grain.	Meal.	Malt.	Potatoes.	Manure.	Turf.	Stone.	Coal, Coke, and Culm.	Sand and Clay.
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
1822	9,805	14,347	2,075	2,967	1,528	11,460	32,730	16,109	10,046	8,334
1823	13,140	14,996	2,105	2,727	1,144	13,047	32,331	18,078	8,935	9,861
1824	12,901	19,802	2,851	2,570	1,837	12,381	34,565	23,125	8,836	12,295
1825	15,373	23,277	2,527	3,524	1,643	14,361	49,230	26,020	10,202	9,701
1826	15,153	19,396	1,888	3,637	2,252	15,328	46,517	23,812	8,510	7,284
1827	15,209	23,590	1,313	2,991	2,158	9,305	48,695	18,113	5,619	8,025
1828	17,152	31,860	1,297	3,049	2,582	14,922	44,092	16,991	7,349	5,015
1829	14,032	22,842	1,691	2,628	3,108	16,022	45,890	19,521	8,712	5,864
1830	14,221	19,500¾	2,407½	4,719	3,990	18,901	44,379½	25,353¾	10,497	10,671
1831	18,866	24,872	4,945½	4,066	6,513¼	24,934	47,965¼	22,069¾	7,292	6,815
1832	20,636½	23,100	3,459	4,017	2,685	20,271½	45,295	17,893¾	7,969	7,125
1833	27,894½	24,543½	4,676½	3,999½	3,141	14,424¼	45,215¼	20,959¾	6,735¼	8,318¼
1834	28,186	20,486	2,991	4,601	2,093	13,289½	43,676½	17,168½	6,755¼	11,166½
1835	28,893	20,331	2,764½	4,830	2,029¾	12,192¾	41,520¾	14,330¾	7,338¼	11,378¼
1836	28,378	22,255	4,533	4,862	2,467	13,228	42,204	15,469	6,774	11,434
1837	24,947½	20,890¾	4,456¾	3,769¾	2,683½	17,255½	40,349¾	15,217½	7,733½	8,574½

Years.	Bricks and Flags.	Timber.	Hay.	Pigs and Cattle.	Ordnance and Baggage.	Slates.	Salt.	Sundries.	Total Tonnage.	Amount of Toll. £	s.	d.
	Tons	Tons.	Tons	Tons	Tons	Tons	Tons	Tons	Tons	£	s.	d.
1822	11,417	652	170	10	–	–	–	13,289	134,939	24,866	4	9
1823	11,896	651	298	46	–	–	–	13,892	143,147	24,058	6	7
1824	20,708	1,417	784	34	–	12	58	15,902	170,078	27,679	7	3
1825	16,116	770	266	96	–	19	74	15,532	188,731	32,328	7	1
1826	15,763	1,521	438	109	–	149	122	18,807	180,686	28,408	16	4
1827	14,671	1,118	652	347	–	499	96	26,772	179,173	33,587	4	9½
1828	17,888	622	257	673	–	448	384	25,806	194,387	35,212	19	0½
1829	20,186	539	145	362	–	8	1,401	28,823	191,774	31,435	15	8½
1830	35,302	839¾	107	643½	65	157½	3,054¾	29,939¾	224,749½	33,464	8	0½
1831	29,322¾	1,089¼	144	765½	123	149½	1,593	36,294	237,819¾	36,753	12	3
1832	27,392¼	320	108½	867	43	19	1,191¾	34,024½	216,418½	34,552	16	6
1833	29,703¼	1,119	126½	1,224½	66	79½	199	34,312½	226,738½	38,054	7	11½
1834	37,783¼	1,280¾	157¼	1,239¼	149	434¾	575	33,490¼	225,473¼	38,123	7	5½
1835	32,095	1,355½	164	1,556¼	68	286	572	33,692¾	215,398½	30,030	3	2½
1836	31,608	1,476	270¼	1,942	448	675	418½	38,329	226,770¾	38,953	4	1½
1837	23,043¾	998¼	420	2,129½	247¾	539½	1,467½	41,185¼	215,910½	37,557	7	1

Tonnage and Tolls from River Shannon to Dublin.

RETURN of the TONNAGE of all COMMODITIES carried on the GRAND CANAL, from the RIVER SHANNON to DUBLIN, for 16 Years, ending 31st December, 1837.

Years.	Flour.	Grain.	Meal	Malt.	Potatoes	Stone, Slates, and Flags	Hay.	Cattle.	Sundries.	Total Tonnage.	Tolls. £	s.	d.
	Tons Cwt	Tons Cwt	Tons Cwt	Tns Cwt	Tons Cwt	Tons Cwt	Tns Cwt	Tons Cwt	Tons Cwt	Tons Cwt	£	s.	d.
1822	1,773 10	1,008 5	72 10	–	18 15	50 15	–	–	196 10	3,120 15	1,699	11	8
1823	2,053 5	2,678 10	261 5	–	87 5	1 10	–	–	263 0	3,354 15	2,181	12	4
1824	1,741 5	3,949 10	502 0	–	81 5	–	–	–	396 5	6,670 5	2,777	6	8
1825	2,338 0	7,307 0	335 15	–	48 0	4 5	–	–	157 10	10,190 10	4,344	9	11
1826	2,585 15	5,136 0	286 5	15 0	51 10	99 5	104 10	38 5	186 15	8,503 0	3,550	0	0
1827	3,051 0	5,784 0	458 15	21 5	45 10	197 0	88 10	76 5	533 5	10,255 10	4,032	0	8
1828	2,462 5	9,033 15	93 5	54 10	67 0	230 15	4 0	232 0	578 10	12,756 0	4,965	3	2
1829	2,452 10	8,342 15	164 5	56 0	88 10	27 10	–	83 10	1,128 15	12,343 15	4,763	16	3
1830	2,396 15	5,607 10	336 10	62 10	246 0	169 0	10 0	88 15	1,954 5	10,921 5	3,982	17	0
1831	2,826 10	5,735 15	816 5	–	16 0	104 5	15 0	45 10	2,446 10	12,006 15	3,955	14	10
1832	3,660 5	7,785 15	386 15	–	46 10	58 0	14 15	75 10	1,779 0	13,806 10	4,258	11	7
1833	6,118 5	5,802 0	382 0	7 0	31 15	93 0	1 0	58 5	1,705 15	16,199 0	5,072	2	5
1834	7,777 0	7,802 5	990 5	–	308 5	164 0	–	90 5	1,393 0	17,805 0	5,131	4	11
1835	9,836 5	6,016 10	1,021 5	–	9 10	149 15	–	43 15	1,339 15	18,416 15	5,204	12	6
1836	9,280 10	6,676 10	917 10	–	63 10	650 10	17 15	112 5	2,625 15	20,344 5	5,629	11	4
1837	6,824 10	6,316 10	795 15	–	58 0	766 10	18 15	238 10	5,515 15	20,534 5	5,669	7	1

Compiled from Returns of respective Officers.

(Signed) A. BAGOT, *Superintendent of Trade Boats.*

GRAND CANAL—*(continued.)*

Return of the **Tonnage** and **Toll**, and **Average Rates** of **Toll** charged on Goods carried on the **Grand Canal**, distinguishing what was brought to and carried from Dublin, in the Year 1837; together with the **Average Distances** the several articles were conveyed.

	TO DUBLIN.										
	Flour.	Grain.	Meal.	Malt.	Potatoes.	Turf.	Stone, Bricks Flags, and Slates.	Sand and Clay.	Hay.	Cattle and Pigs.	Sundries.*
	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.
Tonnage......	24,947 15	20,890 15	4,456 15	3,769 15	2,683 10	40,349 15	38,800 10	8,574 10	420 0	2,129 10	19,685 5
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Toll...........	6,266 8 4	6,166 8 3	1,641 12 8	1,184 13 1	335 8 6	4,293 1 6	2,411 11 6	144 6 0	21 6 8	524 6 3	6,526 17 4
	Stat. Miles.	Stat. Miles.	Stat. Miles.	Stat. Miles.	Stat. Miles.	Stat. Miles.	Stat. Miles.	Stat. Miles.	Stat. Miles.	Stat. Miles.	Stat. Miles.
Average dist. conveyed..	60¼	52½	60½	52½	58¾	35	34½	20½	70	64	50
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Average Toll per Ton..	0 5 0¼	0 5 10½	0 7 4½	0 6 3¼	0 2 6	0 2 1½	0 1 2½	0 0 4½	0 1 0½	0 4 10½	0 6 7½

	FROM DUBLIN.			TOTALS.		TOTALS
1837.	Coal & Coke.	Manure.	Sundries.	From.	To.	From and To.
	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.	Tons. Cwts.
Tonnage	6,015 15	17,255 10	25,931 5	49,202 10	166,708 0	215,910 10
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Toll	628 16 1	305 4 0	7,107 6 11	8,041 7 0	29,516 0 1	37,557 7 1
	Stat. Miles.	Stat. Miles.	Stat. Miles.	Stat. Miles.	Stat. Miles.	Statute Miles.
Average dist. conveyed..	50¾	34½	50	50	50	50
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Average Toll per Ton ..	0 2 1	0 0 4¼	0 5 7	0 3 3½	0 3 8	0 3 5¾

* Under the head of "Sundries," to Dublin, are included Bacon, Wool, Hides, Bones, Tallow, and Lard; Starch, Eggs, Apples, Whiskey, Oysters, Rags, Basket sallows, Empty Vessels, and from Dublin, Merchandise generally—Bale Goods, Woollens, Cottons, Silks, &c.; Shop Goods generally, Teas, Sugars, and Groceries of every kind; Porter, Barm, Tobacco, Herrings, Tallow, Foreign Timber, and Boards, Bar Iron, Ironmongery of all sorts; Cast Metal Ware of every description; Building Materials of all sorts; Furniture, Glass, Machinery.

Compiled from Returns of respective Officers. A. Bagot, *Superintendent of Trade.*

Rates of **Tolls** and usual **Freights** charged for **Goods** conveyed to and from the undermentioned Places.

		TO DUBLIN.												FROM DUBLIN.			
Places on Canal, Shannon, and Barrow.	Distances from Dublin.	Corn, Flour, Malt, &c., per Ton		Wheat per Barrel, 8 to the Ton		Oats per Barrel, 11½ to the Ton.		Potatoes per Ton.		Timber per Ton.		Cattle per Head, about 8 cwt. each		Merchandize per Ton.		Salt and Coal per Ton.	
		Toll.	Gross Freight.	Toll.	Gross Freight	Toll.	Gross Freight	Toll.	Gross Freight	Toll.	Gross Freight	Toll	Gross Freight	Toll.	Gross Freight.	Toll.	Gross Freight
	Stat. Miles.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Robertstown, -	25½	3 2½	5 10	0 5	0 9	0 3½	0 6	2 6	5 2	2 1½	5 9	–	–	3 2½	6 8	2 1½	5 0
Monasterevan, -	40½	5 1	9 3	0 7½	1 2	0 5½	0 9½	2 6	6 9	3 4½	7 7	–	–	4 8	9 3	3 4½	8 0
Athy, - - -	54	6 9	12 5	0 10	1 6½	0 7	1 1	2 6	8 0	4 6	10 1½	–	–	4 8	9 3	4 0	8 0
Tullamore, - -	57	7 1½	12 3½	0 10½	1 6½	0 7½	1 1	2 6	8 5	4 9	10 8	2 0	7 0	7 1½	13 11½	4 0	9 2
Heavy Goods, Iron, &c.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	12 3½	–	–
Shannon Harbour,	79	9 10 Flour	16 0 15 0	1 3	2 0	0 10¼	1 4½	2 6	9 0	6 7	14 10	2 0 Heavy Goods, &c.	8 0	7 10	16 3 14 0	4 0	10 0
Limerick, - -	133	5 0	15 0	0 7½	1 10½	0 5½	1 2	–	–	–	–	–	–	5 0	from 20s. to 30s.	varying on light and heavy goods.	
For Export, -	-	3 0															
Ballinasloe, -	94	11 1	18 0	1 4½	2 3	0 11½	1 6¾	2 10	11 1	7 10	17 7	2 5	8 0	9 1	18 6	4 6	12 0
Heavy Goods, Iron, &c.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16 0		
Galway, - -	138	5 11	21 0	–	–	–	–	–	–	–	–	–	–	9 1	38 6	–	–
Carlow, - -	66	6 9	12 0	0 10	1 6	0 7	1 1	2 6	9 0	–	–	–	–	3 6	10 0	–	–
Barrow Toll, -	-	0 9												1 6			
Waterford, -	-	3 6	12 6	0 10	1 6¼	0 7	1 1	–	–	–	–	–	–	3 6	16 0	–	–
Barrow Toll,		1 6												1 6			

Appendix B.
No. 6.

Inland Navigations.

Royal Canal.

Description.

ROYAL CANAL.

DESCRIPTION.—EXTRACT from the REPORT of MR. TARRANT, Engineer to the ROYAL CANAL COMPANY.

"The length of the direct line of the Royal Canal, from Dublin to where it falls into the Camlin River, is 92 miles; the first off branch from the Broadstone level is 2 miles, when it enters the River Liffey; the second branch departing near Killashee to the town of Longford; the distance is 5 miles, and 90 miles from the Broadstone.

"There are 46 locks, exclusive of a tide-lock, where the canal enters the River Liffey, 25 of which are ascending; 11 of those are double, and 14 are single, the remainder are descending locks. The Canal passes within a mile and a half of Leixlip, touching at Maynooth, Kilcock, and Enfield, passing between the villages of Clonard and Longwood, at 33 miles from Dublin, and on to Thomastown, an extent of 42 miles, being an equal distance of 2 miles from Killucan and Kinnegad, the former on the north, and the latter on the south, from thence to Mullingar, the shire town of Westmeath, and 53 miles from Dublin. Proceeding 12 miles further is Balnacarrig; from thence to Branagan Harbour, 1½ miles from Ballymahon, and 75 miles from Dublin, (Athlone is 12 miles south of this station,) the Canal passes near to Killashee, terminates at Cloondrah, (or Richmond Harbour,) near Tarmonbarry, over the River Shannon, at 7 miles east of Strokestown, in the county of Roscommon."

Passage Boats.

RETURN relating to PASSAGE BOATS.

NAMES OF STAGES.	Distance from Dublin.	Average Time of performing the Journey by Night Boats.		Fares from Dublin to respective Stages.				Average Time of performing the Journey by Fly Boats.		Fares from Dublin to respective Stages.				Total No. of Passengers conveyed by Fly Boats on the Canal, for One Year, ending 31st May, 1837	Total No. of Passengers conveyed by Night Boats on the Canal, for One Year, ending 31st May, 1837
				First Cabin.		Second Cabin.				First Cabin.		Second Cabin.			
	Statute Miles.	H.	M.	s.	d.	s.	d	H.	M.	s.	d.	s.	d		
Clonsilla, - -	8	2	10	0	10	0	7	1	25	1	0	0	8	262	502
Rye Aqueduct, -	11	3	0	1	3	0	10	1	45	1	6	1	0	382	468
Maynooth, - -	15	4	0	1	6	1	0	2	15	2	0	1	3	1,417	1,016
Kilcock, - -	19	5	0	2	0	1	3	2	45	2	6	1	6	1,639	1,440
Ferns, - - -	22	5	35	2	6	1	6	3	10	2	10	1	10	371	622
Newcastle, - -	27	7	0	2	10	1	10	3	50	3	6	2	3	883	801
Moyvally, - -	31	7	50	3	3	2	2	4	15	4	0	2	7	704	1,412
Boyne Aqueduct, -	33	8	30	3	6	2	4	4	30	4	2	2	9	402	800
Hill of Down, - -	36	9	20	3	9	2	6	4	50	4	6	3	0	287	—
Thomastown, - -	42	10	30	4	4	2	10	5	30	5	0	3	6	1,735	1,931
Down's Bridge, -	47	12	10	4	10	3	3	6	30	5	6	3	9	310	—
Mullingar,* - -	52	13	20	5	6	3	6	7	30	6	0	4	0	5,582	5,847
Intermediate Stages, -	—	—		—		—		—		—		—		4,156	—
Coolnahay, - -	59	14	50	6	2	4	0	—		—		—		—	694
Balnacarrig, - -	64	16	10	6	8	4	4	—		—		—		—	2,180
Abbeyshrule, - -	70	17	20	7	3	4	10	—		—		—		—	—
Toome Bridge, -	74	17	50	7	6	5	0	—		—		—		—	—
Ballymahon, - -	75	17	57	7	9	5	2	—		—		—		—	1,480
Terlicken, - -	78	18	22	8	1	5	6	—		—		—		—	—
Kenagh, - -	81	18	48	8	5	5	8	—		—		—		—	—
Junction, - -	85	19	20	8	10	5	10	—		—		—		—	2,540
Longford, - -	90	20	20	9	5	6	3	—		—		—		—	4,331
Intermediate Stages, -	—	—		—		—		—		—		—		—	2,256
Total, - -	—	—		—		—		—		—		—		18,130	28,320

* Mullingar is the utmost extent, at present, to which the Fly Boats proceed; in the course of a month they will probably be sent to Longford. The number of passengers have greatly increased since the establishment of those boats.

Receipts and Expenditure for three years.

RETURN showing the TOTAL RECEIPTS and EXPENDITURE of the ROYAL CANAL COMPANY, in the years 1834, 1835, and 1836.

Years.	Total Receipts for Passengers for Three Years.			Total Receipts for Carriage of Parcels, for Three Years.			Total Receipts of the Royal Canal, for Three Years.			Total Expenditure of the Royal Canal, for Three Years.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1834	6,299	11	10	403	7	1½	24,000	0	11	11,376	10	0
1835	6,898	18	1	448	13	8½	24,082	9	1	10,740	16	9
1836	7,468	8	3½	518	15	4	25,148	19	7	11,912	2	10

REMARKS.—EXTRACTS from COMMUNICATIONS received from the SECRETARY to the ROYAL CANAL COMPANY, dated 9th February, and 5th July, 1837.

"With respect to the Passage Boats, I beg leave to mention that the Directors are getting over, from Paisley, boats upon an improved construction, when, it is expected, the trip from Dublin to Longford can be made in 15, instead of 22 hours, the time which the present boats require; and concerning the Trade Boats, there are some on the Navigation that have been built upon a new principle; those are employed, conveying cattle, by the Inland Steam Company, and it is hoped that the Merchant Traders will avail themselves of the improvement effected in the construction of boats.

"Conveyances start with boat passengers from the following Stages on the Navigation, viz.:—from Mullingar to Castlepollard; from Toome Bridge to Glasson and Athlone; from the Longford Junction to Lanesborough, Roscommon, and Castlerea; from Longford to Newtownforbes, Ruskey, Dromod, Drumsna, Carrick-on-Shannon, and Boyle. In the first cabin no passenger is to pay less than 9*d.* nor more than 8*s.* for any distance; and in the second cabin no passenger is to pay less than 6*d.*, nor more than 5*s.* 6*d.*"

Trade Boats.

RETURNS relating to TRADE BOATS.

Time consumed by Trade Boats drawn by one Horse, between different Places.				Length of Main Line.	Length of Main Line and Branches.	Tonnage of Trade Boats	Draft of Water when Laden.
From	To	Days.	Distance.				
			Miles.	Miles.	Miles.	Tons.	Ft. In.
Terlicken - -	Mullingar, - -	1	26	92	99	40 to 60	4 6
Mullingar - -	Moyvally, - -	1	21				
Moyvally - -	Maynooth, - -	1	16				
Maynooth - -	Dublin, - -	1	15				

Appendix B.
No. 6.

Inland Navigations.

Royal Canal.

ROYAL CANAL—(*continued.*)

TOTAL AMOUNT of TOLLS, DOCKAGE, and WHARFAGE received for Three Years.

Years.	Tolls.	Wharfage.	Dockage.
	£ *s.* *d.*	£ *s.* *d.*	£ *s.* *d.*
1834	12,767 3 4½	97 17 6	87 15 5
1835	12,530 6 5½	103 0 0	110 11 3
1836	13,095 1 8½	107 7 6	83 6 3

RETURN of the TONNAGE of GOODS conveyed upon the ROYAL CANAL to and from DUBLIN, during Two Years and a half, ended the 31st of March, 1838.

Years.	Live Pigs.	Casks of Butter.	Corn, Meal, & Potatoes.	Merchandise.	Coal and Manure.	Turf.	Stones, Sand, Flags, and Bricks.	Total Tonnage.	Total Amount of Tolls.
	Number.	Number.	Tons.	Tons.	Tons.	Tons.	Tons.		£ *s.* *d.*
1836	36,002	7,639	31,746	7,355	14,344	22,992	11,894	88,334	13,095 1 8½
1837	34,349	3,638	26.024	6,247	14,559	21,724	16,127	84,683	10,964 16 5
1838	15,669	3,812	15,881	3,373	4,145	10,214	6,414	40,029	6,954 19 2½

(Signed) SAMUEL DRAPER, *Secretary.*

RETURN, showing the DISTANCE each ARTICLE is conveyed on the ROYAL CANAL, and the AVERAGE TOLL per TON, per MILE, charged on same, &c.

GOODS.	Distance conveyed.	Average Toll per Ton per Mile.	Maximum Toll per Ton, for any Distance.	REMARKS.
	Miles.	*d.*	*s.* *d.*	
Corn, - - -	27 to 92	1¼	7 6	The principal part is brought from between 52 and 92 miles, and also from the Shannon.
Butter and Eggs, -	52 to 92	1¼	7 6	—
Meal and Flour, -	52, 70 to 92	1¼	7 6	A reduction made in the charge when conveyed 12 miles to the canal.
Potatoes, - -	30 to 92	1¼	2 6	Much the greater part conveyed 90 miles. from the counties Longford, Roscommon, Mayo, and Sligo.
Pigs, and Black Cattle, -	52 to 92	–	–	Principally from Mullingar, 52 miles,—Ballymahon, 75 miles,—Longford and Richmond Harbour, 92 miles.
Turf, - - -	24 to 59	1½	–	A reduction of £2 6*s.* 8*d.* per boat-load, when brought from Cappa Bog, distant 24 miles; and of 1*s.* 8*d.* per ton, when brought from Annadruce, distant 59 miles.
Bricks, - - -	–	1½	0 10	—
Flags, - - -	–	1	–	—
Stone, - - -	–	1	20 0 per boat-load.	10*s.* per boat-load, from Coolmine Quarry.
Merchandize, - -	30	1¼	7 0	Some conveyed as far as the Shannon; but the principal part delivered at stations within 30 miles of Dublin.
Coal, - - -	11	1	1 5	Unloaded upon different parts of the line.
Manure, - -	–	–	15 0 per boat-load	Manure has been brought to Lanesboro', on the Shannon. The general tonnage of the boats is from 50 to 60 tons.

REMARKS.—EXTRACT of a LETTER addressed to the SECRETARY of the ROYAL CANAL COMPANY, by Messrs. M'CANN & SONS.

"We beg to observe, that from the great accommodation afforded by the City of Dublin Steam Company, we are enabled to discharge our three boats, (which, from the combination against us, are obliged to travel together,) in one day.

"The Trade Boats travel at the rate of about 16 to 20 English miles per day, including delays.

"Coal conveyed from the River Liffey or Royal Docks, with no other article whatever, shall, in future, be subject only to the following reduced scale of Toll, viz. —

"To the Twelfth Lock, distance 5 miles, at 7*d.* per Ton. To Clonsilla, distance 8 miles, at 10*d.* per Ton. To Rye Aqueduct, distance 11 miles at 1*s.* 1*d.* per Ton. To Maynooth, distance 15 miles, or any greater distance, at 1*s.* 5*d.* per Ton.

"Any Boat that conveys a load of Iron Ore from Lough Allen, may bring a back loading of Coals at a rate of Toll not exceeding 1*s.* per Ton. Coal from Dublin to pay 1*s.* per Ton for any distance, on satisfactory proof that same is to be used in burning bricks."

LOWER SHANNON.

Lower Shannon.

Description.

DESCRIPTION.—EXTRACTS from COMMUNICATIONS received from CHARLES W. WILLIAMS, Esq.

"From Limerick to Kilrush—the length of this Navigation is 44 miles."

TRADE BOATS.

Trade Boats.

REMARKS.—There is no data for ascertaining the quantity of tonnage on this part of the river, as all articles are carried by bulk without reference to tonnage, and according to a fixed scale.

A Steamer leaves Limerick three times a-week for Kilrush, a distance of 44 miles, touching at Tarbert, where the Company have a Store and Agent, returning to Limerick the alternate days. This Steamer carries merchandize of all descriptions, and at very low rates, considerably less than was formerly charged by the Sailing Packets. The principal source of revenue on this part of the Navigation, from the want of intermediate landing places being erected, is derived from passengers.

Appendix B.
No. 6.

Inland Navigations.

Lower Shannon.
Passage Boats.

LOWER SHANNON—(*continued*).

Return relating to Passage Boats.

Names of Leading Places on this Navigation between which Steam Vessels ply.	Distances between Places.	Time of performing the Journey.	Fares for Passengers.		Number of Passengers carried in the year 1836.		
			First Cabin.	Second Cabin.	Upwards.	Down-wards.	Total.
	Miles.	H. M.	s. d.	s. d.			
From Limerick to Tarbert,	35	3 0	3 0	1 6	11,307	9,963	21,270
" to Kilrush,	44	4 0	4 0	2 0			
" to Clare,	28	3 30	1 6	1 0	2,581		2,581

REMARKS.—Before the introduction of Steam Vessels, few passengers travelled by water, this Navigation of 44 miles being uncertain and dangerous. So little intercourse was there, even a few years back, that there was not a single public car or vehicle of any description to convey passengers from Kilrush to Kilkee, or any part of the neighbourhood; whereas, in the year 1836, above 40 public cars were daily in attendance, waiting the arrival of the Steamer from Limerick. The number of passengers and the extent of trading intercourse are rapidly increasing.

Limerick Navigation.

LIMERICK NAVIGATION.

Description.

DESCRIPTION.—Extracts from Communications received from Charles W. Williams, Esq., Managing Director of the Inland Navigation Company.

"The Navigation between Limerick and Killaloe is part River and part Canal, and is divided in the manner shown by the following Table. The measurements which are taken from the Surveys made by Mr. Rhodes along the bed of the river, do not include several crossings and sweeps, and, therefore, are not of the same extent as the trackway, which is 15 British miles in length."

Passage Boats.

Return relating to Passage Boats.

Division of the Canal, showing the Names of Trading Places on it, together with the Number of Locks, and distinguishing those parts which are River Navigation and Canal.				Fares.		Time of performing the Journey.		No. of Passengers in 1836.
Names of Places.	Number of Locks.	Distances between Places.	Nature of Navigation.	First Cabin.	Second Cabin.	By Iron Boat.	By Passage Boat.	
		Feet.		s. d.	s. d.	H. M.	H. M.	
From Limerick to River Shannon, -	2 single.	4,992	Canal.	1 8*	0 10	2 30	3 30	14,600
" Limerick Canal to Plassey Lock,	—	5,400	River.					
From Plassey Lock to River Shannon, at Erina, - - - -	4 single and 2 double.	29,314	Canal.					
From Erina Canal to Cussane Lock, -	—	23,760	River.					
" Cussane Lock to Killaloe Pier, -	2 single and 1 double.	11,458	Canal.					
Total, - - - -	14 single Locks.	74,924		* Half Fare only charged to passengers on returning the same day.				
		FEET. M. F. P. Y.						
River Navigation being - - - -		29.160 = 5 4 7 1						
Canal Navigation being - - - -		45,764 = 8 5 13 1						
Total, - - - - - -		74,924 = 14 1 20 2						

REMARKS.—The passengers on the Limerick Navigation average about 40 persons daily.

On this Navigation there is but one town or place of trading intercourse, viz.:—O'Brien's-bridge, where a tolerable market-town may be established. There are numerous landing places along the Navigation for turf, lime, marl, stone, &c.

Packet Boats for passengers go the entire length of this Navigation daily; one of these Boats takes 3½ hours: the second, a light iron boat, on the Scotch plan, goes in 2½ hours, 50 minutes of which time are occupied in passing the locks.

One Boat for passengers leaves Killaloe every morning at 7 A.M., for Limerick, and returns the same evening. The second (the Scotch Boat) leaves Limerick for Killaloe every morning at 6 A.M., and returns every evening immediately on the arrival of the Steamer at Killaloe. This latter boat conveys the passengers between Limerick and Dublin. These passengers are conveyed by the Steamers from Killaloe to the Grand Canal at Shannon Harbour, in the King's County, a distance of 54 miles from Limerick, and thence by the Canal Packets to Dublin, a further distance of 79 miles.

Trade Boats.

Return relating to Trade Boats.

Length of Navigation.	No. of Locks.	Draft of Water of Trade Boats.	Time consumed by Trade Boats.	Trade and Intercourse of this Navigation consists of,		Tonnage of Trade Boats.	Amount of Tonnage and Tolls received for 6 years, ending 1836.		
				Number of Boats.	Belonging to		Years.	Tons.	Amount of Tolls.
B Miles.		Ft. In.	H. M.						£ s. d.
15	14	4 6	6 0	1 Packet Boat for Passengers, -	Dublin Steam Company.	From 40 to 60 Tons.	1831	28,212	1,092 14 0
							1832	28,942	1,117 0 7½
				2 Trade do. -	Dublin Steam Company.		1833	31,357	1,209 7 3
				3 Trade do. -	To other Proprietors.		1834	34,993	1,349 12 1
				4 Turf do. -	To Limerick Distillery.		1835	*34,162	1,494 8 9
							1836	36,018	1,514 2 0

* Canal being under repair, causes this year's deficiency.

REMARKS.—Extracts from Communications received from Charles W. Williams, Esq., dated Jan. 24th, 1836.

"The Tolls are fixed at a maximum of 1*s.* per ton per Irish mile, for all description of goods, turf excepted, which is 4*s.* per load, manure free. A reduction of Tolls is about to be made on slates, lime, stone, sand, &c. Turf is carried under an old contract, at 4*s.* each lighter load.

The greater part of the trading intercourse being carried on by the Dublin Steam Company's Boats, between Limerick and Dublin, above three-fourths of the entire revenue from tolls are paid by that Company, arising from the carriage of produce of all sorts, and live stock to Dublin, and general merchandize and British and Irish manufacture from Dublin, with Irish slates, turf, manure, foreign and native timber. Foreign timber, hitherto rarely seen on this Navigation, is now carried in great quantities on its way to the several countries to which the Navigation is now practicable."

Appendix B.
No. 6.

Inland Navigations.

Middle Shannon.

Steam Vessels.

MIDDLE SHANNON.

DESCRIPTION.—The Middle Shannon is that part of the river on which the Grand Canal Company have a jurisdiction 39 miles in extent, from the north end of the canal at Athlone to the north end of Lough Derg, two miles below Portumna bridge. The navigation is partly river and partly canal. There are four locks, viz.:—Hamilton, at the entrance of the Cloonaheuegue Canal, opposite Meelick; one at Banagher, one at Shannon-bridge, and one at Athlone.

RETURN of STEAM VESSELS employed by the INLAND STEAM NAVIGATION COMPANY on the MIDDLE SHANNON, (*connected with the City of Dublin Steam Packet Company.*)

Names of Vessels.	Names of Places. From	Names of Places. To	Distances in Statute Miles.	Usual No. of Hours per Voyage.	Registered Tonnage.	Horse Power.	Draft of Water when laden.	No. of Voyages per Annum.	No. of Passengers conveyed in one year.	Fares. Cabin.	Fares. Deck.	Of what built.
										s. d.	s. d.	
Lansdowne -	Killaloe -	Portumna -	25	6	282	90	6	312	4,083	4 0	2 0	Iron.
Clanricarde*	Do. -	Do. -	28	8	130	28	5	–	–	–	–	Timber.
Avonmore -	Portumna -	Shan.Harbour	13	6	103	24	3½	312	4,083	2 6	1 3	Iron.
Dunally -	Do. -	Do. -	13	6	103	18	3½	312	–	2 6	1 3	Iron.
Wellesley -	Shan.Harbour	Athlone -	20	8	101	12	3½	104	–	–	–	Iron.

* The Clanricarde employed towing Lumber Boats.

Tonnage and Tolls.

RETURN of the NUMBER of BOATS and their TONNAGE, which navigated the SHANNON from PORTUMNA and ATHLONE respectively; likewise the AMOUNT of TOLLS received from BOATS which navigated the SHANNON, but which did not enter the GRAND CANAL; also, the AMOUNT of TOLLS received from BOATS which did enter the GRAND CANAL—distinguishing Turf Tolls from those received for Produce or Merchandise; likewise the GRAND CANAL TOLLS received from all BOATS navigating the SHANNON for the last SEVEN YEARS, from 1st January, 1829, and ending 31st December, 1835.

Years.	Number of Boats.	Portumna Tonnage.		Number of Boats.	Athlone Tonnage.		Amount of Tolls on Boats which did not enter on the Grand Canal.			Amount of Tolls on Boats which did enter on the Grand Canal.			Amount of Tolls received from Turf Boats.			Amount of Grand Canal Tolls on Boats which navigated the Shannon.*		
		Tons.	Cwts.		Tons	Cwts.	£	s.	d.	£	s.	d.	£	s.	d	£	s.	d.
1829	342	9,252	0	88	1,519	0	82	17	3	168	10	10	28	10	1	4,599	14	0
1830	450	13,169	10	66	1,199	15	161	2	10	137	6	11	41	12	9	4,646	10	11
1831	428	12,586	0	124	2,462	5	117	5	7	113	12	1	35	16	1	4,226	17	4
1832	380	11,639	15	107	2,719	15	111	2	9	87	11	6	22	7	8	4,144	10	1
1833	413	13,407	10	151	4,336	5	128	19	4	94	9	9	15	16	10	5,393	8	11
1834	441	13,885	10	171	4,684	15	121	18	10	71	8	0	24	3	1	5,387	10	4
1835	467	15,482	5	130	3,993	0	97	12	10	66	10	7	20	6	7	5,425	4	3

* Those are the gross amounts of Tolls received, the drawbacks allowed not having been deducted.

"The smallness of the amount of Shannon Toll is to be attributed to the facts stated in the printed Schedule, that Boats plying to or from Dublin, and any part of the River above Shannon Harbour, and Steam Navigation Company's Boats two miles below Portumna, and also twenty miles on the Grand Canal, are exempt from that Toll by a special order; therefore, there is no Shannon Toll charged on goods brought from Athlone to Dublin."

MICHAEL SWEENY, *Accountant to Grand Canal Company.*

Stations.

STATIONS to which the INLAND STEAM NAVIGATION COMPANY'S INTERCOURSE extends, and at each of which they have an AGENT.

ON THE GRAND CANAL.—Philipstown, Kilbeggan, Tullamore, Ballinasloe, Athy, Mountmellick, Portarlington, Monasterevan.

ON THE RIVER SHANNON.—Shannon Harbour, Banagher, Portumna, Turryglass, Dromineer, Killaloe, Limerick, Ennis, Tarbert, Kilrush, and Athlone.

Upper Shannon.

UPPER SHANNON.

DESCRIPTION.—EXTRACTS from COMMUNICATIONS received from Mr. JOHN KELLY, Inspector, dated 8th December, 1836.

"The length of this Navigation, from the head of Lough Allen to Lough Ree, is about 59 miles: there are no off branches navigable. There are six locks; and the distances between leading places, by water, are as follows, viz.:—from the head of Lough Allen to Lough Allen Canal, near Drumshambo, 12 miles; from Drumshambo to Leitrim, 6 miles; from Leitrim to Carrick-on-Shannon, 6 miles; from Carrick-on-Shannon to Jamestown, 6 miles; from Jamestown to Drumsna, 4 miles, from Drumsna to Ruskey, 8 miles, from Ruskey to Cloondrah, 9 miles, and from Cloondrah to Lanesborough, 8 miles, making a total of 59 miles.

Trade Boats.

RETURN relating to TRADE BOATS.

Tonnage of Trade Boats.	Draft of Water when Laden. Summer.	Draft of Water when Laden. Winter.	Freight charged by Boat Owners, including Tolls.	Years.	Imports and Exports.	Manure.	Grain.	Meal.	Potatoes.	Coal.	Metal or Iron.	Ironstone.	Lime.	Sand.	Sundries.	Timber.	Slates.	Turf.	Total Number of Tons.	Amount of Tolls received. £	s.	d.
						Tons	Tons	Tons	Tons	Ton	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons.	Tons.	£	s.	d.
From 30 to 50 Tons.	3 Feet 3 Inches.	4 Feet 6 Inches.	1*d.* per Ton per Mile	1834	Imports	78	53	22	–	265	20	–	–	476	1071	40	191	–	2,216	33	6	9
				1834	Exports	–	4262	322	1182	100	304	200	–	–	20	–	60	5	6,456	60	2	11
																		Total	8,672	93	9	8
				1835	Imports	50	10	–	68	75	20	–	–	163	1288	219	–	45	1,918	41	2	0
				1835	Exports	–	6690	88	529	40	20	245	135	–	–	–	105	–	7,852	59	0	9
																		Total	9,770	100	2	9

REMARKS.—"There are no Passage Boats on this Navigation. The time consumed by the Trade Boats, for different distances, depends on the wind and state of the weather; they generally travel from 10 to 40 miles per day.

"The following are the rates of Tolls, for the whole length of the Navigation, on empty vessels, or those laden with corn, meal, malt, flour, potatoes, turf, manure, lime, sand, limestone, iron, and ironstone, native coal, culm, Killaloe slates, or cut stone from the quarries at Lanesborough, 18*s.* 5*d.* for the whole cargo; vessels laden with general cargoes £1 16*s.* 11*d.* The freight usually charged by the boat owners, including Tolls, is about 1*d.* per Ton per Mile."

Appendix B.
No. 6.

Inland Navigations.

Lagan Navigation.

Description.

LAGAN NAVIGATION.

DESCRIPTION.—EXTRACTS from COMMUNICATIONS received from JAMES M'CLEERY, Esq., Secretary.

"The Lagan Navigatian commences at Belfast. and terminates in a bay on Lough Neagh, called Ellis' Gut; the entire distance, from the bridge at Belfast to the lock at Lough Neagh, being 28¾ statute miles. The Navigation is partly river and partly still water, from Belfast to the eastern end of the Summit Level, where there is a treble lock, a small basin, and single lock connecting with the summit; these are called the Union Locks. Between Belfast and the first lock is a tidal navigation, the distance 2¾ miles; the next two levels are seven-eighths of a mile long each; the fourth, 2½ miles; the fifth, half a mile; the sixth, seventh, eighth, and ninth, three-quarters of a mile each; the tenth and eleventh, half a mile each; the twelfth, thirteenth, and fourteenth, three-quarters of a mile each; ending at the Union Locks;—the number of locks being seventeen, and the distance thirteen miles. The Summit Level is 11½ miles in length, and from it to the Lough are ten locks of equal falls, seven feet each, except the lowest one, which varies with the level of Lough Neagh."

Trade Boats.

RETURN relating to TRADE BOATS.

Average Tonnage of Boats.	Draft of Water.		Usual Time consumed.		
	Summer.	Winter.	Names of Places.	Days.	
				Summer.	Winter.
Tons.	Feet.	Feet In.			
50	4	4 9	Belfast to Lisburn, - -	1	1½
			" Summit, - -	1½ or 2	2 or 3
			" Lough Neagh, -	1, 2, or 3	3 or 4

Tolls, Tonnage, and Rates of Freight.

RETURN of the NUMBER of LOADED LIGHTERS of 50 TONS each, RATES of TOLLS for said TONNAGE, and RATES of FREIGHT per TON.

RETURN of the Number of loaded LIGHTERS of 50 Tons each, Amount of TONNAGE, Rate and Amount of TOLLS, &c., Year 1836.

Names of Places.	No. of Boats Laden	Number of Tons.	Rates of Tolls, ⅌ 50 Tons. £ s. d.	Amount of Tolls for 1836. £ s. d
Belfast to Lough Neagh,	370	18,500	3 0 0	1,110 0 0
" Summit, -	204	10,200	2 0 0	408 0 0
" Lisburn, -	197	9,850	1 10 0	295 10 0
" Drumbridge,	–	–	1 0 0	–
Lough Neagh to Belfast,	77	3,850	2 10 0	192 10 0
Summit to Belfast, -	32	1,600	1 14 1	54 10 8
Lisburn to Belfast, -	–	–	1 5 0	–
Drumbridge to Belfast,	–	–	0 16 3	–
Intermediate places, -	14	*700	–	–*
Total, -	894	44,700		2,060 10 8

RATES of FREIGHT per TON between different Places on the NAVIGATION.

Names of Places.	Rates per Ton. s. d. s. d.
Belfast to Newry, - from	6 6 to 7 0
" Coal Island, - -	6 6 - 7 0
" Blackwatertown, -	6 6 - 7 0
" Crumlin, - -	6 6 - 7 0
" Antrim, - -	6 6 - 7 0
" Portadown, - -	6 6 - 7 0
" Ballyronan, - -	6 0 - 7 0
" Ellis' Gut, - -	4 0 - 4 6
" Hillsboro' Distillery,	3 0 - –
" Boyle's Basin, -	3 6 - –
" Lisburn, - -	3 0 - –
Lough Neagh to Belfast, -	5 0 - 6 0

* Taking £1 14*s.* 5*d.* as a mean of the Rates of Tolls given in the Return, the Toll on 700 tons may be averaged at £24 1*s.* 10*d.*

Tonnage and Tolls.

RETURN showing the AMOUNT of TONNAGE conveyed on the LAGAN NAVIGATION, during the Years 1831, 1832, 1833, 1834, 1835, 1836, and 1837, and the RATE and AMOUNT of TOLL.

Amount of Tonnage.	Rate of Toll per Ton, for the entire Voyage.	Total Amount of Toll. £ s. d.
265,750	Ninepence Halfpenny.	10,738 7 11

REMARKS.—EXTRACTS from LETTERS of JAMES M'CLEERY, Esq., SECRETARY to the LAGAN NAVIGATION COMPANY, dated 5th December, 1836, and 28th April, 1838.

"The landing places in the interior, with which this Navigation affords means of communication, are these; on its own line, the bleach greens, mills, and factories between Belfast and Lisburn, the town of Lisburn, and the lime-kilns and brick fields in its neighbourhood; the towns of Hillsborough and Moira, and the distilleries, breweries, and lime-kilns adjacent; to Magheralin and Soldierstown; to the villages of Aghalee, and Kilmore, where grain is purchased and sent on the Canal; and the town of Lurgan, and its distillery and breweries. It likewise affords a means of communication to the country adjoining the shores of Lough Neagh, and the Lower and Upper Bann, and the Blackwater.

"The Tolls charged being alike for every article, no Register is kept of the cargoes of the different lighters passing on the Canal. The principal lading from Belfast is Coals; Foreign Timber to the amount of about fifteen thousand tons was taken in rafts during the period mentioned in the last Return, besides a considerable quantity of Plank of various scantlings in lighters: herrings, salt, groceries, iron, bleaching stuffs, spirits, barm, bark, &c. &c., are also conveyed on the Canal; but the precise quantity, or any correct approach thereto, it is impossible to state.

"Within the last seven years, above thirty-five thousand tons of grain and flour, Potatoes, sand, stone, fire brick, tile, &c., have been brought to Belfast from the interior, which is included in the foregoing statement.

"The toll charged amounts to a fraction more than ninepence-halfpenny per ton for the entire of each of the voyages.

"There are not any Passage Boats on the Lagan Navigation, nor is it conceived that any could be beneficially established on it; nor is it apprehended that the Ulster Railway will materially, if at all, interfere with the conveyance of goods on the Lagan Navigation."

Appendix B.
No. 6.

Inland Navigations.

Newry Navigation.

Description.

Trade Boats.

NEWRY NAVIGATION.

DESCRIPTION.—EXTRACTS from COMMUNICATIONS received from HUGH BOYD, Esq.

"The length of the Newry Canal, from its entrance at Fathom (two miles nearer the sea than Newry, to its termination at Whitecoat, where it joins the River Bann, is 16¾ Irish miles.

The communication between Newry and the sea is by the Canal to Fathom, a distance of two miles; and from thence, by the River to tha deep Water at Warrenpoint, a distance of 3½ miles."

RETURN relating to TRADE BOATS.

Distances between Newry and Leading Places.	Number of Locks.	Tonnage of Boats.	Draft of Water.	Amount of Tolls and Freight per Ton between different Places. Places.	Tolls.	Freight.	The Annual Amount of Tolls on an average of the years 1834, 1835, and 1836.
					s. d.	s. d.	£ s. d.
From Newry to Banbridge, by Canal, to Scarra, a distance of 9 miles; from thence, by land, 3¾ miles. From Newry to Tanderagee, by Canal, to Madden Bridge, a distance of 11 miles; and from thence, by land, 1 mile. From Newry to Gilford, by the Canal, to Madden Bridge, 11 miles; and by land, 1 mile. From Newry to Portadown, by the Canal and River Bann, a distance of 16 miles. From Newry to Dungannon, by Canal, River Bann, Lough Neagh, and Blackwater, to Verner's Bridge, 30 miles; and by land, 4 miles. From Newry to Moy, by Canal, River Bann, Lough Neagh, and Blackwater, 34 miles. From Newry to Charlemont, by Canal, River Bann, Lough Neagh, and Blackwater, 34 miles. From Newry to Blackwatertown, same communications, a distance of 37 miles. From Newry to Armagh, same communications, with an addition of 4 miles by land From Newry to Lurgan, from Lough Neagh into Kinnegoe Gut, 34 miles, and 1 mile by land. From Newry to Ballyronan, into Lough Neagh, as before, and 16 miles through it; in all, 40 miles.	14	From 50 to 60 Tons.	From 5 feet to 5 feet 6 inches.	From Newry to Scarra* -	30 0	2 9	3289 14 8
				" Madden Bridge	36 0	3 0	
				" Portadown -	39 0	3 0	
				" Lurgan -	39 0	4 0	
				" Ballyronm -	39 0	4 6	

RETURN of the TONNAGE of GOODS conveyed on the NAVIGATION, and AMOUNT of TOLL paid thereon during Seven Years, commencing with 1831.

Years.	Tonnage.	Amount of Toll.
		£ s. d.
1831	70,479	2,414 3 10
1832	88,434	3,029 11 8
1833	89,165	3,054 11 2
1834	99,383	3,404 0 8
1835	101,514	3,477 6 5
1836	102,770	3,520 18 2
1837	102,332	3,505 11 5

* These rates of tolls are for Boats fully laden; if only partly laden the toll is proportioned. The sea tolls chargeable on vessels coming to and leaving Newry, are, if laden, 1s. 1*d.* per ton for both cargoes, if light, 1*d.* per ton on registered tonnage.

REMARKS.—There are not, at present, any Passage Boats on this Canal; but it is in contemplation to have them established in the ensuing year. Steam Vessels trading to this port are, at present, obliged to discharge and load at Warrenpoint, and though not chargeable with toll, the expense to the trade, by trans-shipment or land carriage to Newry, is considerable. This expense will be done away with, when the improvements, now in progress, shall have been completed, which will enable vessels drawing 14 feet water to come up to the town; and, at the same time, an addition will be made to the annual amount of tolls of upwards of £3,000.

Tyrone Navigation.

Description.

Trade Boats.

TYRONE NAVIGATION.

DESCRIPTION.—EXTRACTS from COMMUNICATIONS received from Mr. WILLIAM ROBINSON, Inspector.

Tha length of this Canal from Coal Island to where it joins tha River Blackwater, and thence to Lough Neagh, is 11¾ English miles.

RETURNS relating to TRADE BOATS.

Distances between different leading Places, and Time of performing the Journey by Trading Boats.			Number of Locks.	Tonnage of Boats.	Draft of Water. Summer.	Draft of Water. Winter.	Rates of Tolls and Freights between the undermentioned Places. Names of Places.	Rates of Tolls.	Rates of Freight.
	Mls.	Days			Ft. In.	Feet		s. d.	s. d.
From Coal Island to Lough Neagh	7¾	1	7	From 30 to 50 tons.	4 6	5	For freighted vessels coming into Coal Island with Merchant goods	18 0	–
							For freighted vessels, for each lock, not coming the entire distance	3 0	–
From Lough Neagh to where the Canal joins the River Blackwater	4	0½					For freighted vessels outwards - -	9 0	–
							If laden with flax seed, lime, turf, building stone, sand, or manure, in or out	2 6	–
							From Belfast to Coal Island - -	–	6 6
							From Newry to Coal Island - -	–	4 6

Appendix B.
No. 6.

Inland Navigations.

Trade Boats.

TYRONE NAVIGATION—(*continued.*)

Description and Amount of Goods and Articles Imported and Exported in the Year 1836.

Articles Imported.		Quantity.	Tons.	From what Places.	Articles Exported.	Tons.	To what Places.
Square Timber -	Tons	1,160	1,160	Belfast and Newry -	Flour -	500	Belfast and Newry.
Planks and Deals	,,	400	400	Do. do. -	Oats -	1,400	Do. do.
Staves, - -	No.	15,000	–	Do. do. -	Potatoes	55	Do. do.
Slates - - -	Tons	730	730	Wales - - - -	Coals -	718*	Portadown.
Bar and Wrought Iron - - -	,,	450	450	Newport, Bristol, Liverpool, and Glasgow	Brick & Tile	1,308	Belfast and Newry.
Sheet & Lead Ore	,,	20	20	Liverpool - - -			
Salt - - -	,,	300	300	Belfast and Newry -			
Herrings - -	Brls.	150	–	Liverpool - - -			
Coals - - -	Tons	–	250	Belfast and Newry -			
Total -			3,310		Total -	3,981	

* The coal trade of Drumglass Colliery has almost declined altogether, it having only exported 18 tons of coals this last year. The remaining 700 tons are from Mr. Griffith's coal pit at Coal Island.

REMARKS.—There is an uninterrupted line of Navigation from Coal Island to Belfast, a distance of 61 miles—and the distance is performed in three days; also from Coal Island to Newry, a distance of 39½ miles—which is performed in two days.

Lower Boyne Navigation.

Description.

THE LOWER BOYNE NAVIGATION.

DESCRIPTION.—Extracts from Communications received from J. H. Hudson, Esq.

The Boyne,—partly a Still Water, and partly Canal Navigation,—extends from Drogheda, in the county of Louth, to Navan, in the county of Meath, a distance of 19 Statute miles. That part of the Navigation designated the Lower Boyne, which is now in the hands of the Board of Public Works, extends from Drogheda as far as Carrickdexter, and is 12¾ Statute miles in length, on which there are 7 Locks. Slane is the only intermediate town of any importance.

Trade Boats.

Return relating to Trade Boats.

Return of the Tonnage of Merchandise conveyed on the Lower Boyne Navigation, Upwards and Downwards, during the Years 1835 and 1836.

Years.	Coal.	Wheat.	Timber.	Soap.	Stone.	Barley.	Total.	Amount of Tolls collected in the Years 1835, 1836, and 1837.
Upwards.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	£ s. d.
1835	3,777½	1,165	12½	1	48½	–	5,004½	
1836	3,629	947	12	–	18	2	4,608	641 16 4½
Years.	Wheat.	Oats.	Flour.	Oatmeal.	Bran.	Pigs.	Total.	638 9 1
Downwards.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	1280 5 5½
1835	1,163	194½	2,004	1,350½	635½	18½	5,366	
1836	1,189	130	1,452½	2,211	587	17	5,586½	

Tolls in 1837 amounted to £706 18*s.* 4*d.*

REMARKS.—The rate of freight charged by Boat Owners is 3*s.* per ton from Drogheda to Slane. and 4*s.* 6*d.* per ton from Drogheda to Navan; out of which they pay a toll of 1½*d* per ton per mile on the Lower Navigation, and 2*d.* per ton per mile on the Upper. The draught of boats in winter is 4 feet 8 inches; in summer, 3 feet 6 inches: and the time consumed between Drogheda and Slane is, in summer, seven hours, in winter nine hours; and from Slane to Navan, four hours in summer, and six hours in winter. The whole of the traffic, with the exception of what is delivered at Slane, and to a few individuals above that place, goes on to Navan.

There are no Passage Boats on this Navigation.

Slaney Navigation.

Description.

SLANEY NAVIGATION.

DESCRIPTION.—Extracts from Communications received from R. D. Gibbons, Esq.
Dated 23rd and 29th November, 1836.

"The Slaney River is navigable for any vessel that can come over the harbour bar to about six miles above Wexford: but scarcely any ever go beyond the draw-bridge. It is a natural river, and no means are used either to maintain or improve it. The entire traffic is carried on by Cots, (flat bottomed Boats of 15 to 20 tons,) these can go always loaded to within about 4 miles of Enniscorthy, generally to within about 2 miles, and sometimes the entire way.

"The tide flows up the river about 10 statute miles. so as to affect the water, but the level of the river is affected by backwater up to the town of Enniscorthy, which is about 18 statute miles from Wexford by the River, and 14 by the Mail Coach road.

"There is no source of ascertaining precisely the amount of traffic on the River, but a calculation has been made by persons well acquainted with the matter, by which it would appear, that the traffic averages about 1,200 tons per week, or about 60,000 tons per year. Down the river almost exclusively Grain, and up Limestone for Manure, Coals, Timber, and imported Ship Goods.

"The Boats vary from 15 to 20 tons, and draw from 3 feet 3 inches to 4 feet water. The Boats are occasionally interrupted by a scour at about 4 to 4½ miles from Enniscorthy, but this occurs only when the waters are very low and at neap low water. The scours, where they are generally stopped, are about 2 to 2½ Irish miles from the town."

Suir Navigation.

Rates of Freights.

SUIR NAVIGATION.

The following are the usual Freights charged for Goods conveyed on the Suir Navigation, from Clonmel to Carrick-on-Suir:—

Corn, Flour, Malt, &c., gross freight,	4*s.* 6*d.* per ton.	Timber, by measurement 40 ft., gross freight,		3*s.* 9*d.*	per ton.
Wheat, per barrel, 8 to the ton, do.	4*s.* 6*d.* ,,	Merchandise, - - -	do.	4*s.*	,,
Oats, per barrel, 11½ to the ton, do.	4*s.* 6*d.* ,,	Salt and Coal, - - -	do.	4*s.*	,,

No Cattle conveyed from Clonmel to Carrick-on-Suir.

REMARKS.—There are ten proprietors of Trade Boats in Clonmel. The Trade Boats average from 20 to 40 tons; the amount of Trade may be estimated at about 3,000 tons. There are no Tolls charged on the Navigation.

Appendix B.
No. 6.

Inland Navigations.

Barrow Navigation.

THE BARROW NAVIGATION.

Description.

DESCRIPTION.—The river Barrow becomes navigable at Athy, in the county of Kildare, 42 miles from Dublin, completing an uninterrupted line of inland communication, through the medium of the Grand Canal, from Dublin to the sea below Waterford—a distance of upwards of 120 miles. The rivers Nore and Suir fall into it, the former one mile above the town of Ross, the latter a short distance below Waterford. The depth of water from Athy to Carlow is nearly three and a half feet during the summer, and five feet in the winter months, being sufficient for Boats carrying fifty tons. The principal interruption in the Navigation exists between Carlow and St. Mullins, but it is available for Boats of from thirty to forty tons, during six months in the year. Between Athy and St. Mullins Scars, a distance of 43 miles, there are 12 Stages and 23 Locks. There is a trackway for horses, 40 miles in length, from Athy to below St. Mullins; there are five considerable towns upon or adjacent to its banks, and several very extensive Flour Mills.

Trade Boats.

TRADE BOATS.

Names of Stages, with Distances, and Number of Locks between each.

Places. From	Places. To	Stages.	Distance. Mls.	Locks.
Athy,	Levitstown Lock,	1	4	1
Levitstown Lock	Maganey Bridge,	2	2	1
Maganey Bridge	Carlow Lock,	3	6	2
Carlow Lock	Milford,	4	4	1
Milford	Leighlinbridge,	5	4	2
Leighlinbridge	Bagnalstown,	6	2	1
Bagnalstown	Ballyellan Lock,	7	6	3
Ballyellan Lock	Goresbridge,	8	1	1
Goresbridge,	Ballytuglea Bridge,	9	3	2
Ballytuglea Bridge	Cournellan Lock,	10	4	2
Cournellan Lock	Graigue Lock,	11	2	3
Graigue Lock	St. Mullin's Scars,	12	5	4

Time consumed by Trade Boats between different Places.

Places. From	Places. To	Number of Days.
Dublin	Athy,	2
Dublin	Carlow,	3
Dublin	Bagnalstown,	4
Dublin	Goresbridge,	4
Dublin	St. Mullins,	5
Dublin	Ross,	6
Dublin	Waterford,	7
Waterford	Ross,	1
Waterford	St. Mullins,	2
Waterford	Goresbridge,	3
Waterford	Bagnalstown,	4
Waterford	Carlow,	5
Waterford	Athy,	6
Waterford	Dublin,	8

Tonnage of Trade Boats, and Draft of Water, when Laden.

First Class. Tonnage	First Class. Draft of Water. Feet.	First Class. Draft of Water. In.	Second Class. Tonnage	Second Class. Draft of Water. Feet.	Second Class. Draft of Water. In.	Third Class. Tonnage.	Third Class. Draft of Water. Feet.	Third Class. Draft of Water. In.
50	3	11	40	3	6½	40	3	10

The Description and Amount of Goods conveyed on the Navigation, during the Year 1835.

Up River. Description.	Up River. Tons.	Down River. Description.	Down River. Tons.
Merchandise*	6,616¾	Merchandize,	4,021¼
Corn, Meal, Malt, and Flour,	13,946½	Corn, Meal, and Flour,	17,084
Sea Coal,	2,660¼	Irish Coal,	3,903¼
Flags,	8,878½	Turf,	4,253¾
Slates and Tiles,	1,244½	Culm (Irish),	2,727
		Manure,	749
Total ..	33,346½	Total ..	32,738¼

Usual Rates of Freights, charged on Goods between different Places.

Goods.	Places. From	Places. To	Freights per Ton. s.	Freights per Ton. d.
Merchandise.	Dublin	Carlow,	10	0
do.	Dublin	Bagnalstown,	10	0
do.	Dublin	Goresbridge,	10	0
do.	Dublin	Waterford,	15	0
do.	Waterford	Dublin,	15	0
Flour,	Waterford	Dublin,	12	0
do.	Goresbridge	Dublin,	13	4
do.	Bagnalstown	Dublin,	13	0
do.	Carlow	Dublin,	11	6
Butter,	do.	Waterford,	13	4
Sea Coal & Timber,	Waterford	Carlow,	5	0

A Return showing the progressive Increase of Tonnage and Tolls for the following Periods.

Years.	Tons.	Amount of Tolls. £	
1790	16,000	121	Irish Currency.
1800	19,828	1,405	
1810	36,262	3,965	
1820	41,262	3,827	
1830	58,100	4,290	British.
1835	66,084	4,966	

Receipts and Disbursements of the Barrow Navigation Company, for Five Years.

Years.	Receipts. £	s.	d.	Disbursements. £	s.	d.
1832	5,003	17	0	2,363	17	10
1833	4,815	17	4	2,691	15	4
1834	5,905	11	10½	5,845	0	3¾
1835	5,100	11	11	4,311	12	11
1836	4,975	6	0	2,449	6	2½

* Of the above Merchandise, 2,722 tons were Timber.

REMARKS.—Extracts from Communications received from the Secretary to the Barrow Navigation Company.

"The Expenditure on the Works of the Barrow Navigation, exclusive of Establishments, now amounting to £812 a year, was, from 1790 to 1802, £62,215 18*s.* 1*d.*, from 1802 to 1811, £62,807 9*s.* 2*d.*; and from 1811 to 1836, £52,829 9*s.*;—making a total of £177,852 16*s.* 3*d.* The Company have not received any Loans, but received two Grants, made to them from the Public, viz., in 1790, the sum of £17,600; and in 1802, a further sum of £20,625—making a total of £38,225. The progressive improvements of the Navigation may be thus stated :—In 1790, when the Barrow Navigation Company became first incorporated, the river was navigated by boats, which in the summer months, carried a loading of three to five tons, and, in the winter, eight to ten tons, hauled by men, at the rate of one man per ton in summer, and two in winter—there being no horse trackway. The improvements in the Navigation, since the above period, may be stated as follows:—A trackway for horses, from Athy to below St. Mullins, 43 miles; and 17 additional Locks, with their respective Wears and Embankments, suited to a River Navigation."

Appendix B.
No. 7.

Steam Vessels.

APPENDIX B. No. 7.

RETURNS RELATING TO GOVERNMENT AND MERCHANT STEAM VESSELS.

Names of Companies and Proprietors.	Names of Vessels.	Names of Ports. From	Names of Ports. To	Distance in Statute Miles.	Usual No. of Hours per Voyage.	Registered Tonnage.	Horse Power.	Draft of Water when laden. Ft. In.	Number of Voyages per Annum.	Total Number of Passengers conveyed in the year 1836.	Fare for each Passenger. Cabin. s. d.	Fare for each Passenger. Deck. s. d.
Her Majesty's Steam Packets for conveying the Mails.	Zephyr	Holyhead	Kingstown	62½	7	237	100	8 10	243	11,330	15 0[a]	5 0
	Gleaner	do.	do.	62½	8	300	100	9 6	243		15 0[a]	5 0
	Doterel	do.	do.	62½	6½	237	100	8 9	243		15 0[a]	5 0
	Otter	do.	do.	62½	6	237	120	9 3	243		15 0[a]	5 0
	Cuckoo	do.	do.	62½	7	234	100	9 4	243		15 0[a]	5 0
	Sprightly	do.	do.	62½	7½	234	100	9 3	243		15 0[a]	5 0
	Avon	Liverpool	Kingstown	130	12	–	160	10 6	91	–	–	–
	Shearwater	do.	do.	130	12	–	166	10 6	91	Adults 24,875 Children 1,121 Servants 1,267	21 0[b]	No Deck Passengers
	Lucifer	do.	do.	130	12	–	190	10 6	91		10 6[b]	
	Urgent	do.	do.	130	12	–	284	10 6	91		10 6[b]	
	Advice	Milford	Dunmore	81	13	189	80	9 0	91	Cabin 837 Deck 1 3 1	30 0	5 0
	Adder	do.	do.	81	13	241	80	9 0	91		30 0	5 0
	Pigmy	do.	do.	81	13	250	80	9 0	91		30 0	5 0
	Monkey	do.	do.	81	13	209	80	8 10	91		30 0	5 0
	Fury	Portpatrick	Donaghadee	21	3	112	50	6 3	175	564 | 3,772	8 0	2 0
	Spitfire	do.	do.	21	3	111$\frac{74}{94}$	50	6 4	185	564 | 3,772	8 0	2 0
The City of Dublin Steam Packet Company. [c]	City of Dublin	Dublin	Liverpool	136	14½	189	120	11 6	99	–	12 6	3 6
	Britannia	do.	do.	136	13	248	160	11 0	98	–	12 6	3 6
	Liffey	do.	do.	136	16½	201	110	10 6	90	–	12 6	3 6
	Mersey	do.	do.	136	17	166	120	10 6	84	–	12 6	3 6
	Commerce	do.	do.	136	14	195	150	11 0	122	–	12 6	3 6
	Leeds	do.	do.	136	13½	242	140	12 0	118	–	12 6	3 6
	Birmingham	do.	do.	136	13½	232	140	11 6	118	–	12 6	3 6
	Shamrock	do.	do.	136	16½	192	80	11 3	45	–	12 6	3 6
	Nottingham	do.	do.	136	13½	227	130	12 0	94	–	12 6	3 6
	Ballinasloe	do.	do.	136	14	191	130	12 0	128	–	12 6	3 6
	William Huskisson	do.	do.	136	15	212	160	11 4	78	–	12 6	3 6
	Kingstown	do.	do.	136	17½	71	66	9 0	1	–	12 6	3 6
	Royal William [d]	—	—	–	–	380	260	–	–	–	–	–
	Roscommon [d]	—	—	–	–	300	260	–	–	–	–	–
	Royal Adelaide [d]	—	—	–	–	380	270	–	–	–	–	–
	Roscrea [d]	—	—	–	–	300	270	–	–	–	–	–
	Hibernia	Dublin	Belfast	94	14	210	130	11 9	104	–	12 6	3 6
	Athlone	Belfast	Liverpool	150	14	264	190	12 3	104	–	12 6	3 6
	Margaret	Cork	do.	260	27	370	240	15 0	52	–	25 0	12 6
Inland Steam Navigation Company, in connexion with the City of Dublin Steam Packet Co.	Garryowen, Iron	Limerick	Kilrush & Tarbert	45	5	287	100	5 0	156	20,015	4 0	2 0
	Clarence, . Timber	do.	Clare	30	3½	202	50	5 0	104	2,581	1 6	0 9
	Lansdowne, Iron	Killaloe	Portumna	25	6	282	90	6 0	312	4,083	4 0	2 0
	Clanricarde, Timber	do.	do	25	8	130	28	5 0	–	–	–	–
	Avonmore, . Iron	Portumna	Shan. Harb.	13	6	103	24	3 6	312	4,083	2 6	1 3
	Dunally, . Do.	do	do	–	–	103	18	–	–	–	–	–
	Wellesley, . Do.	Shan. Harb.	Athlone	20	8	101	12	3 6	104	–	–	–
	Nonsuch . Do.	Killaloe	Limerick	15	5	–	10	1 3	312	4,083	1 8	0 10
The St. George Steam Packet Company. [e]	Express [f]	Dublin	Bristol	220	26	169	110	9 0	104	–	–	
	Jupiter	do.	Glasgow	190	20	288	220	11 0	104	–	–	–
	Innisfail	do.	Cork	170	20	169	120	11 0	104	–	–	–
	Hercules	do.	do.	–	–	265	200	–	–	–	–	–
	Herald	Cork	London	–	–	174	130	–	–	–	–	–
	Emerald Isle	do.	do.	–	–	220	150	–	–	–	–	–
	Victory	do.	Bristol	268	28	256	150	–	–	–	–	
	City of Bristol	do.	do.	–	–	209	180	–	–	–	–	–
	William IV.	do.	do.	–	–	176	90	–	–	–	–	–
	Ocean	do.	Liverpool	–	–	207	250	–	–	–	–	–
	St. David	Newry	do.	–	–	110	70	–	–	–	–	–
	Erin	do.	do.	–	–	180	100	–	–	–	–	–
	Earl of Roden [g]	Dundalk	do.	130	16	227	130	11 6	312	11,100 to and fro	12 6	2 6
	Cumberland [g]	do.	do.	130	16	210	90	11 6	312		12 6	2 6
	Juno [h]	Cork, London, & Bristol		220	22	362	250	11 0	–	–	–	–
	Sirius [h]	Cork	London	–	–	411	300	14 0	–	–	43 6	–
	Tiger [h]	—	—	–	–	–	–	–	–	–	–	–
	Vulture [h]	—	—	–	–	335	240	–	–	–	–	–

[a] Servants and Children, half-price.

[b] In the year subsequent to the date of the Return the Fares were reduced—Adults to 12*s*.; Children to 6*s*.; and Servants to 6*s*. In the same year there was a falling off in the number of passengers conveyed by the Packets on this Station—the total number being 24,073.

[c] The amount of business done in a given period cannot be ascertained further than by referring to the number of voyages in the above table. The vessels always sail full; whereas from Liverpool one-half return to Dublin without cargo—the exports from Ireland being so much greater than the imports. The cargoes from Dublin are nine-tenths live stock. The return cargoes consist of merchandise of all descriptions, British and foreign; the produce of British mines, &c. The rates vary, depending on the description of goods.—Flour and Meal from Dublin to Liverpool, 8*s*. 6*d*. per ton. Flour and Meal from Limerick to Liverpool, by inland navigation to Dublin, 16*s*. 8*d*. per ton.—Cattle, Dublin to Liverpool, from 5*s*. to 12*s*., according to the day of the week and the size of the beast.—Sheep, 2*s*. per head, and Pigs from 1*s*. 6*d*. to 4*s*., according to size. A vessel belonging to this Company plies between Dublin and Bordeaux, during the summer months; average time of voyage, 70 hours.

[d] These vessels are now on the stocks. [e] This Company declines giving publicity to the amount of business done by them.

[f] The Express plies between Dublin and Bristol, in conjunction with the Albion, which belongs to the Bristol Steam Packet Company.—Tonnage of the latter, 270;—Horse power, 200.

[g] The amount of business done by these two vessels, together with the rates of freight, will be found in a Return furnished by the Agent at Dundalk. See Return, marked A, page 65.

[h] Lately launched—Juno, measurement, 280,—Sirius, measurement, 340.

Appendix B.
No. 7.

Steam Vessels.

Names of Companies and Proprietors.	Names of Vessels.	Names of Ports.		Distance in Statute Miles.	Usual No. of Hours per Voyage.	Registered Tonnage.	Horse Power.	Draft of Water when laden.	Number of Voyages per Annum.	Total Number of Passengers conveyed in the year 1836.	Fare for each Passenger.	
		From	To								Cabin.	Deck.
								Ft. In.			s. d.	s. d.
The Dublin & London Steam Packet Company.	Thames	—	—	–	–	331	160	–	–	–	–	–
	Shannon	—	—	–	–	324	180	–	–	–	–	–
	Royal Tar	—	—	–	–	220	307	–	–	–	–	–
	City of Londonderry	—	—	–	–	120	231	–	–	–	–	–
	William Fawcett	—	—	–	–	140	205	–	–	–	–	–
British and Irish Steam Packet Company.	City of Limerick	Dublin	London	–	87	–	200	13 0	52	5,000	37 6	12 6
	Royal William	do.	do.	–	77	–	275	13 0	52	5,000	37 6	12 6
Londonderry and Glasgow Steam Packet Company. (a)	Foyle	L. Derry	Glasgow	138	–	136	50	10 0	–	80	12 0	3 0
	Saint Columb	do.	do.	138	–	153	50	10 0	–	80	12 0	3 0
	Rover	do.	do.	138	–	200	80	9 0	–	80	12 0	3 0
North-west of Ireland Steam Packet Company. (b)	Isabella Napier	L. Derry	Liverpool	240	23	236	232	13 0	52	3,120	–	–
	Robert Napier	do.	do.	240	23	206	180	11 0	52	3,120	–	–
Dublin and Glasgow Steam Packet Company.	Arab (c)	Cork	Dublin	180	18	–	–	–	–	–	15 0	5 0
			& Glasgow	370	40(d)	213	150	10 0	73	–	30 0	10 0
	Mercury (c)	Cork	Dublin	180	18	–	–	12 0	73	–	15 0	5 0
			& Glasgow	370	40(d)	–	–	–	–	–	30 0	10 0
Drogheda Steam Packet Company. (e)	Grana Uile	Drogheda	Liverpool	150	14	245	190	12 0	66	15,600	12 0	2 6
	Irishman	do.	do.	150	14	232	180	12 0	65			
	Green Isle	do.	do.	150	14	213	160	11 6	68			
	Fair Trader	do.	do.	150	14	200	150	11 0	17			
	Town of Drogheda	do.	do.	150	14	234	130	11 0	0			
J. Redmond	Town of Wexford	Wexford	Liverpool	–	18	162	150	10 0	52	Cabin. Deck. 300 2,000	12 6	5 0
James Lacy	Eclipse	do.	do.	–	20	107	100	8 6	52	275 825	10 0	5 0
City of Cork Proprietors.	Eagle (Iron)	Cork	Cove	12	1½	119	60	3 8 to (f) 4 0	400	–	0 9	0 6
	Air	do.	do.	–	–	71	60	nearly 8 0 (f)	–	10,000 (h)	0 9	0 6
	Lee	do.	do.	–	–	87	40	4 10 to (f) 5 0	–	–	0 9	0 6
	Waterloo	Cork	Cove and Kinsale.	–	–	47	56	3 6 to (f) 3 8	–	–	–	–
	City of Cork	do.	do.	–	–	59	18	4 0 to (f) 4 3	–	–	–	–
	Shannon	Deepening the River.		–	–	57	20	–	–	–	–	–

(a) The description and amount of cargo and rates of freight will be found in a very detailed form, in a Return hereunto subjoined, and marked B, page 65. (b) General rates of freight, 12*s.* to 20*s.* per ton.—Pigs, 2*s.*—Cattle, 6*s.* to 12*s.* each.

(c) The cargo consists of goods.—No Cattle.—The freights vary from 10*s.* to 30*s.* per ton.

(d) Exclusive of stoppage in Dublin.

(e) The "Town of Drogheda" Steam Vessel did not ply during the year 1835. The freights are as follows:—Flour, Oatmeal, &c., 10*s.* per ton.—Bale Goods, 4*d.* per foot.—Fat Cows, 10*s.* 6*d.*—Sheep, 1*s.* 10*d.*—Lambs, 1*s.*—Pigs, according to size, from 1*s.* to 3*s.*—Horses, 12*s.* 6*d.* to 15*s.*—The exports for the year amounted to 8,410 Cows, 806 Calves, 27,961 Sheep and Lambs, 94,343 Pigs, 168 Horses, 2,255 crates of Eggs—freightage of do., 8*s.* per crate,—516 bales of Linen, and 3,120 tons of Wheat, Flour, Oatmeal, &c.

(f) The draft of water is when coals and water are on board, and not when laden with passengers.

(g) The Cabin Passengers average about one-fourth of the whole number.

Sailing Vessels.

RETURN of the Number of PASSENGERS conveyed in H. M. SAILING PACKETS between HOLYHEAD and DUBLIN, in the Year ended 1st January, 1815.—*Extracted from the Second Report of the Select Committee on Holyhead Roads, dated the 17th June,* 1815.

Names of Ports.		Cabin Passengers.	Half Passengers, Servants.	Hold Passengers.	Total Number of Passengers.	Observations.
From	To					
Dublin	Holyhead,	5,785	585	432	6,802	Including Five Hired Packets, averaged at Ten Cabin Passengers each.
Holyhead	Dublin,	6,357	551	867	7,775	
	Total,	12,142	1,136	1,299	14,577	

Appendix B. No. 7.

Sailing Vessels.

RETURN of the Number of PASSENGERS, CARRIAGES, and HORSES, carried in H. M. SAILING PACKETS between HOLYHEAD and HOWTH, from the 1st January, 1819, to the 31st December, 1821, both inclusive.—*Extracted from the Fifth Report of the Select Committee on Holyhead Roads, dated the 12th June*, 1822.

TO HOWTH.							TO HOLYHEAD.						
Year.	Whole Passengers.	Half Passengers.	Deck Passengers.	Four-wheeled Carriages.	Two-wheeled Carriages.	Horses.	Year.	Whole Passengers.	Half Passengers.	Deck Passengers.	Four-wheeled Carriages.	Two-wheeled Carriages.	Horses.
1819	5,578	513	1,007	273	49	217	1819	5,021	515	268	232	39	206
1820	2,862	402	845	133	21	117	1820	2,734	328	277	92	23	141
1821	4,992	835	2,016	259	42	124	1821	4,646	811	437	248	36	186

RETURN of the NUMBER of PASSENGERS, HORSES, and VEHICLES conveyed by STEAM PACKETS between DONAGHADEE and PORTPATRICK, and PORTPATRICK and DONAGHADEE, for three Years, ending 1824.

From Donaghadee to Portpatrick.								From Portpatrick to Donaghadee.						
Years.	Number of Cabin Passengers.	Number of Servants.	Hold.	Number of Horses.	Number of Vehicles.	Quantity of Machinery Carried.	Amount of Proceeds.	Years.	Number of Cabin Passengers.	Number of Servants.	Hold.	Number of Horses.	Number of Vehicles.	Amount of Proceeds.
						Cwt.	£ s. d.							£ s. d.
1822	226	35	3,382	175	15	100	427 4 0	1822	216	66	3,863	90	11	475 3 0
1823	225	58	3,312	152	10	60	441 9 6	1823	222	88	3,882	129	17	496 11 6[a]
1824	205	91	2,784	375	14	50	493 5 0	1824	206	69	3,488	45	9	453 8 0[b]

[a] In the month of May, 1823, 31 horses belonging to the 7th Dragoon Guards, were conveyed by these packets; and in December of same year, part of the 73rd Regiment of Foot, which swells this amount by £15 15*s*.

[b] In September, 1824, part of the 65th Regiment of Foot, £6 6*s*.; and in November, same year, part of the same regiment were conveyed, £12 12*s*.

The following are the rates of freights, viz.:—Horses, 7*s*. 6*d*. each.—Carriages, £1 1*s*.—Curricles, 15*s*.—Cars, 3*s*.—Jaunting Cars, 7*s*. 6*d*.—Gigs, 10*s*. 6*d*., and Machinery, 3*d*. per cwt.

Steam Vessels.

Deck Passengers.

A STATEMENT of the Number of DECK PASSENGERS conveyed by STEAM VESSELS between IRELAND and GREAT BRITAIN, to and from the following Ports in the Years 1835, 1836, and up to the 30th September, 1837; *furnished by the Steam Packet Agents at the several Ports.*

Names of Ports.	Years.	Numbers to and from England and Scotland in each year.						Numbers to and from England and Scotland during the months of May, June, July, August, and September.						Counties in Ireland to and from which the majority of deck passengers travel, as nearly as the same can be ascertained.
		To			From			To			From			
		England.	Scotland.	Total.	England.	Scotland.	Total.	England.	Scotland	Total.	England.	Scotland.	Total.	
Waterford and Milford.	1835	358	–	358	759	–	759	146	–	146	247	–	247	Cannot be ascertained.
	1836	402	–	402	850	–	850	161	–	161	238	–	238	
	1837	294	–	294	324	–	324	171	–	171	186	–	186	
Kingstown and Holyhead.	1835	660	–	660	741	–	741	351	–	351	386	–	386	Supposed to come from Dublin and adjacent counties.
	1836	578	–	578	682	–	682	299	–	299	353	–	353	
	1837	496	–	496	590	–	590	323	–	323	406	–	406	
Donaghadee and Portpatrick.	1835	–	4,366	4,366	–	4,343	4,343	–	2,142	2,142	–	2,387	2,387	Down, Armagh, Louth, Meath, Monaghan, Tyrone, Donegal, Westmeath, Antrim, Derry.
	1836	–	4,083	4,083	–	3,797	3.797	–	2,257	2,257	–	2,017	2,017	
	1837	–	3,368	3,368	–	2,445	2,445	–	2,305	2,305	–	1,694	1,694	
Londonderry and Liverpool.[a]	1835	836	–	–	420	–	–	295	–	–	180	–	–	Tyrone, Fermanagh, Leitrim, Sligo, Donegal and Derry.
	1836	1,735	–	–	1,611	–	–	1,255	–	–	643	–	–	
	1837	1,467	–	–	1,157	–	–	840	–	–	560	–	–	
Kingstown and Liverpool.	Her Majesty's Mail Steam Packets, between Liverpool and Kingstown, have conveyed no Deck Passengers during the three years above specified, with exception of a few soldiers and seamen, which does not appear to fall strictly within the meaning of this return.													

[a] The greater part of the Deck Passengers from Londonderry to Liverpool are dealers, and persons intending to emigrate to the United States

A large number of labourers and other poor persons go from Londonderry to Glasgow, by the Glasgow and Londonderry Steamers,

Appendix B.
No. 8.

Sailing
Vessels.

RETURN of the Number of PASSENGERS conveyed by SAILING PACKETS between DUBLIN and HOLYHEAD, for Three Years, ending 1820. Received from CAPTAIN BEVIS, R.N., Agent at Holyhead.

Years.	Number of Cabin Passengers.	Number of Servants and Children.	Number of Deck Passengers.	Total Number of Passengers.
1818	11,290	1,008	857	13,155
1819	10,650	1,033	1,264	12,947
1820	5,388	475	983	6,846
Total,	27,328	2,516	3,104	32,948

RETURNS of the EXPORTS and IMPORTS of DUNDALK and LONDONDERRY, by STEAMERS, in the years 1836 and 1837.

Referred to in Note (c), page 62, and Note (a), page 63.

(A.)—DUNDALK STEAM PACKET COMPANY.

ARTICLES.		QUANTITY. Number.	Estimated Weight. Tons.	Cwt.
EXPORTED.				
Oatmeal,	tons	238	238	15
Wheat,	tons	44	44	12½
Barley,	tons	46	46	10
Oats,	tons	27	27	8
Malt,	tons	45	45	0
Vetches,	tons	8½	8	5
Flour,	tons	12	12	0
Flax,	tons	181	181	0
Hams,	tons	30	30	0
Tanners' Waste, and Bones,	tons	40	40	0
Feathers,	tons	5	5	0
Rags,	tons	60	60	0
Bacon,	bales	500	62	10
Linen,	bales	141	70	10
Osiers,	bundles	656	—	
Butter,	firkins	17,095	657	10
Lard,	firkins	67	2	11
Ale,	casks	87	34	16
Apples, 17,000, or 34 casks,	casks	34	—	
Pins,	cases	103	—	
Poultry, 832 tops, containing 83,200 Fowls, Geese, and Turkeys,	number	83,200	—	
Eggs, 19 crates, and 439 boxes,	number	2,328,000	83	3
Whiskey,	puncheons	4	2	0
Passengers,*	number	5,700	—	
Cattle,†	head	5,004	1,668	0
Horses,	head	180	90	0
Pigs,‡	head	44,377	2,958	10
Lambs and Sheep,‖	head	7,790	236	0
Goats,	head	178	5	8
Mules,	head	27	9	0
IMPORTED.				
Iron,	tons	27	27	13
Yeast,	puncheons	144	—	
Cement,	barrels	156	19	10
Tar,	barrels	186	23	5
Pitch,	barrels	90	11	5
Herrings,	barrels	610	101	13
Hardware,	tierces-brls.	500	82	10
Resin,	barrels	2,367	295	17
Ashes,	bales,brls.	112	14	0
Seeds,	sacks	230	23	0
Seeds,	casks	650	113	15
Sugar,	hogsheads	127	95	5
Sugar,	tierces	87	34	16
Oil,	casks	264	105	12
Hides, salted,	number	832	20	16
Hides, dried,	number	347	8	13
Tea,	chests	182	6	10
Hats,	boxes	118	19	13
Soap,	boxes	626	104	6
Fruit,	packages	467	77	16
Merchandize,	packages	1,091	181	16
Glass,	crates	277	27	14
Passengers,	number	5,400	—	
Earthenware,	crates	470	78	6

(B.)—LONDONDERRY STEAM PACKET COMPANY.

ARTICLES.		QUANTITY. Number.	Estimated Weight. Tons.	Cwt.	Rates of Freight, &c.
EXPORTED.					
Oats,	tons	1,798	1,798	0	8s. per ton.
Barley and Bere,	tons	145	145	0	—
Wheat,	tons	12	12	0	—
Oatmeal,	tons	106	106	0	—
Potatoes,	tons	483	483	0	8s. per ton.
Flax,	tons	1,121	1,121	0	20s per ton.
Beef,	tierces	541	135	5	1s. 6d. per tierce. 1s. 3d. per barrel.
Pork,	tierces	945	236	5	—
Bacon,	bales	105	13	2	12s. 6d. per ton.
"	hhds	34	6	16	—
Bones,	hhds	28	–	–	—
Butter,	firkins	16,437	632	4	6d. per firkin.
Lard,	firkins	302	15	2	—
Flour,	tons	24	24	0	—
Rags,	tons	97	97	0	—
Tanners' Waste,	tons	32	32	0	—
Eggs,	boxes	3,524	352	8	2d. per foot.
Butter,	boxes	698	116	6	—
Linen Cloth,	boxes	74	11	2	—
Hides,	bundles	2,147	71	11	12s. 6d. per ton.
Hams,	crates	78	–	–	—
Cows, &c.,	head	543	181	0	6s. each.
Horses,	head	98	49	0	10s. to 20s. each.
Pigs,	head	2,749	183	5	6d. each.
Sheep,	head	154	4	13	1s. each.
IMPORTED.					
Coal,	tons	589	589	0	9s. per ton.
Pig Iron,	tons	390	390	0	7s. per ton.
Castings,	tons	200	200	0	12s. per ton.
Hemp,	tons	15	15	0	—
Flour,	tons	20	20	0	—
Sugar,	hhds.	1,644	1,233	0	10s. per ton.
Earthenware,	hhds.	315	31	10	6s. per hhd. & crate.
Tobacco,	hhds.	107	–	–	10s. per hhd.
Merchandize,	bales	801	240	7	—
Merchandize,	boxes	821	136	16	—
Merchandize,	bags	343	34	6	—
Merchandize,	trusses	559	0	0	—
Merchandize,	parcels	712	–	–	—
Merchandize,	packages	799	133	3	—
Merchandize, casks, kegs, brls. &c.		697	–	–	—
Clothes,	bales	427	64	1	—
Herrings,	barrels	671	111	16	—
Ale,	casks	773	309	4	4s. 6d. per bbd.
Ashes,	casks	79	15	16	10s. per ton
Oil,	casks	251	100	8	—
Yeast,	casks	60	24	0	—
Alum,	casks	64	12	16	—
Molasses,	casks	118	47	4	10s. per ton.
Copperas,	casks	148	29	12	—
Candy Sugar,	boxes	666	111	0	10s. per box.
Oranges and Lemons,	boxes	110	18	6	—
Barley,	bags	567	56	14	—
Pepper,	bags	468	46	16	—
Seeds,	bags	688	68	16	—
Tea,	chests	540	19	5	2s. per chest.
Vitriol,	carboys	384	10	5	—
Whiskey,	puncheons	1,368	684	0	7s. 6d per puncheon.
Bottles matted,	packages	326	54	6	—
Earthenware,	crates	346	34	12	6s. per hhd. & crate.
Hampers,	Number	194	–	–	—
Jars,	Number	68	–	–	—
Trusses of Mats,	Number	87	–	–	—

* Cabin Fare, 12s. 6d.—Deck Fare, 2s. 6d.

† 2s. 6d. to 10s. per head.

‡ 1s. to 3s. 6d. each.

‖ Sheep, 1s. 9d.—Lambs, 1s.

Appendix B.
No. 8.

Mines and Quarries.

APPENDIX B. No. 8.

RETURNS RELATING TO THE MINES AND QUARRIES IN IRELAND.

MINES WORKED BY THE MINING COMPANY OF IRELAND.—*December*, 1836.

COUNTY.	DENOMINATION.	Power applied to Machinery.	No. of Men employed.*	Annual Produce.	Present Value per Ton.
				Tons.	£ s. d.
Armagh (a)	Derrynoose Lead Mine Steam Engine now being erected for unwatering the Mine.	—	—	—	—
Dublin (b)	Ballycorus Smelting Works, Rolling and Pipe Mill, and Shot Tower	Water	20	800 to 2,400	27 0 0
Tipperary (c)	Killaloe Slate Quarries	Water	350 to 400	7,000 to 10,000	1 10 0
Tipperary (d)	Slieve Arda Collieries	5 Steam Engines	200 to 300	30,000	0 10 0
Waterford (e)	Knockmahon Copper Mines	Water	1,000	4,000 to 5,000	9 0 0
Waterford (f)	Glenpatrick Slate Quarry	Water	120	2,500 to 3,000	1 10 0
Wexford (g)	Cairme Lead Mine Steam Engine now being erected for unwatering the Mine.	—	—	—	—
Wicklow (h)	Luganure Lead Mine	Water	150 to 300	1,200 to 3,600	15 0 0

MINES OPENED BY THE MINING COMPANY OF IRELAND since the Date of the above Return.

COUNTY.	DENOMINATION.	Power applied to Machinery.	No. of Men employed.	Annual Produce.	Present Value per Ton.
				Tons.	
Kerry (i)	Kilcrohane Copper Mine, near Cahirciveen.	—	20	—	—
Tipperary (k)	Hollyford Copper Mine, near Cappawhite.	—	20	—	—
Tipperary (k)	Ballysinode Copper Mine, near Cappawhite.	—	20	—	—
Waterford (l)	Annestown Lead Mine, near Tramore.	—	16	—	—

Sept. 16th, 1837. (Signed) RICHARD PURDY.

* A great many persons are employed who do not appear on the Company's books; carriers, for instance, of whom many hundred are employed in conveyance of Lead ore and Coals to the works, and of Copper ore to the shipping ports, as well as of Slates and Coals to the various inland markets opened for them.

(a) The ore will be conveyed on cars to Newry, for shipment to the Company's smelting works, or for sale in ore. Supplies of Timber, &c., will be landed at Newry, and sent from thence to the mine on cars, until the opening of the Ulster canal, or a railway shall afford a more eligible means of transport.

(b) Supplies of Timber, Iron, &c., for these establishments, are sent on cars from Dublin.

(c) The Slates are conveyed on cars for the supply of the county of Tipperary, King's and Queen's counties; and by boats on the Shannon Navigation and Grand and Royal canals, for the supply of the counties of Limerick and Clare, the several towns on the Shannon and the canals, especially Limerick and Dublin. Supplies of Iron, &c., conveyed by boat from Dublin and Limerick.

(d) Coal and Culm conveyed on cars to the surrounding district, extending to Limerick, Clare, Galway, Waterford, Kilkenny, and Dublin. The produce of these collieries is of a superior quality; the Coal (anthracite) containing 96 per cent. of Carbon, and the ton of Culm producing 70 barrels of Lime, which is extensively used as manure in a widely extended district, where this Coal and Culm are almost the only fuel, even for domestic purposes, and their use is chiefly limited by the very imperfect means of transit which at present exist. From the extent and character of the Coal fields recently opened by the Mining Company, and the facilities erected for working them, the produce of these collieries may be increased to almost any extent to which the means of transport by railways or canals shall extend the circuit of consumption. Supplies of Timber conveyed on cars from Clonmel, or woods in the district: the Steam Engines landed at Waterford, sent by boat to Clonmel, and from thence on cars: Iron and other supplies sent from Dublin on cars.

(e) The ore is shipped at the mines in boats, the vessels riding at anchor at some distance from the land, the nearest harbour (Dungarvan) being 10 miles distant. Supplies of Timber imported at Waterford from Norway, and of Iron from Wales, and conveyed to the mines on cars, distance, 13 miles.

(f) The Slates are conveyed on cars for the supply of an extensive district in the counties of Waterford, Kilkenny, Tipperary, and part of Cork, and in boats on the river Suir to Waterford. Supplies of Iron, &c., conveyed on cars from Clonmel.

(g) The ore will be conveyed in boats from Enniscorthy to Wexford, for shipment to the Company's smelting works at Ballycorus, or for sale in ore, as may be found most advisable. Supplies of Timber, &c., will be landed at Wexford, and sent in boats to Enniscorthy, from whence it will be removed to the mine on cars.

(h) The ore is conveyed on cars from the mines to the smelting works, and there manufactured into Pig and Sheet Lead. Leaden Pipe and Shot sent on cars to Dublin for sale.

(i) The ore will be shipped at West Cove, near the mine, and supplies received coastwise at the mine.

(k) The ore from these mines will be shipped at Clonmel in boats, for conveyance to Pilltown or Waterford, there to be shipped for Swansea; and supplies will be received from Waterford, Limerick, or Dublin, as may be found most expedient. (l) The ore will be shipped at Waterford, distant 8 miles, and supplies received from thence.

Appendix B.
No. 8.
Mines and Quarries.

MINES and QUARRIES WORKED BY OTHER PARTIES than the MINING COMPANY.

COUNTY.	Denomination and Description.	SITUATION, &c.	Annual Produce.	Value of same.	At what Port shipped.
*CLARE (a) .	Moneypoint Quarry produces a fine hard, close-grained, gritty Flag, varying from 1½ to 4 inches thick, and containing from 10 to 20 superficial feet.	Within 4 miles of Kilrush, on a cliff overhanging the Shannon.	About 60,000 yards.	£2,250 at Quarry.	From the Quarry.
*CLARE (b) .	Clounderlough Quarry produces a fine Bourdella Marble.	Clounderlough Bay, Lough Derg.	—	—	—
†CLARE . .	Lead Mines.	Near Ennis.	Not known.	Not known.	—
‡CORK (c) . .	Rockfarm Limestone Quarries.	The Quarries are situated on Little Island, 6 miles east of the city of Cork, opposite to Passage-west, and extend a mile along the verge of the Cork river.	12,000 tons manufactured 44,000 rough.	13s. per ton. 1s. 4d. per ton.	4 Wharfs, within 150 yards of each Quarry.
‖CORK (d) . .	Irish Dove Marble and Limestone Quarries.	Carrigacramp, near Cloyne.	2,000, and upwards.	Depends on the manner in which it is manufactured.	Rostellan Quay, adjoining the Marquis of Thomond's estate.
†CORK (e) . .	Allihies Copper Mine.	Near Castletown.	6,000 to 7,000	£9 per ton.	—
†CORK . .	Andley Copper Mine.	Near Skibbereen.	Not known.	Not known.	—
†CORK . .	Dromagh Collieries.	Near Kanturk.	Not known.	Not known.	—
†DOWN (f) .	Lead Mines.	Near Newtownards.	Not known.	Not known.	—
§GALWAY (g) .	Black Marble Quarry, of the most superior quality.	The whole of the Marble district, with a trifling exception, is situated on the estate of Sir Valentine Blake, on the verge of Lough Corrib, extending along the river, and convenient for water carriage.	1,000	Has sold for £12 per ton, but now only brings from £7 to £8 at London and New York.	Galway.
*GALWAY (h) .	A very fine Irish Sienna and Dove marble.	Shannon Harbour.	—	—	—
‖KERRY (i) . .	Valentia Quarry produces roofing Slate & Flagging, the latter of which is of a superior description, not only with regard to size & appearance, but more particularly to strength, in which respect it has been found to surpass every other description of Flagging in use in London, and has accordingly been used in many of the public buildings there.	Island of Valentia, off the coast of Kerry.	—	Flags, £1,800 Slate, £550	Valentia.

* Information furnished by Mr. W. H. Owen.

† Information furnished by Mr. Purdy, Secretary to the Mining Company of Ireland.

‡ Information furnished by Mr. John Cantillon, jun.

‖ Information furnished by the Messrs. Fitzgerald.

§ Information furnished by the Inspector.

(a) It is stated that this Quarry extending all along the coast, and known by the name of Moneypoint, is inexhaustible, though the consumption at present is comparatively small, owing to the expensive manner in which it is worked, and the consequent high price at which the produce is sold, as well as the exposed situation of the Quarry, which renders it both difficult and hazardous for shipping to approach it. 24,000 superficial yards are shipped annually for Cork; 16,000 ditto are conveyed from the Quarry by small boats to Galway, Tralee, &c., and 20,000 ditto to Limerick, of which 16,000 superficial yards are cubed and manufactured at Killaloe, and shipped for Dublin, London, and Liverpool.

(b) Opened for Specimens only.

(c) The produce of these Quarries is stated to be of the very best quality; for the purpose of hewing it is unequalled, and from its very fine grain and colour is peculiarly adapted for large public buildings, in which it is generally used. The refuse is converted into Lime, and is in much demand for ballasting vessels, preparing roads, &c.; at present it is removed by means of horse carts, but in future it will be conveyed by a railroad which is at present being laid down for that purpose. One hundred men are daily engaged in working these Quarries, but it is stated that if fully worked they would afford employment to six times that number. The average price of carriage per ton per mile by water, may be estimated at 2d., and by land at 6d.

(d) The produce of this Quarry has in some years amounted to between 5,000 and 6,000 tons.

(e) The Allihies Copper Mine is worked by steam and water, and employs from 1,200 to 1,500 men. The Ore is conveyed to Hookers for shipment to Swansea for sale. Supplies of Timber, &c. received by sea.

(f) The Ore is shipped to England for sale. Supplies for the Clare Mines received from Limerick, and for the Down Mines from Belfast.

(g) This Quarry, it is stated, is capable of giving profitable employment to 20,000 men, but at present it is only partially worked.

(h) The produce of this Quarry is exported in its rough state.

(i) This Quarry has been worked a little, and the Marble has turned out very good. The working of this Quarry has been carried on for the last five years by the Knight of Kerry. It has been open as a Slate Quarry for the last twenty years, but it is only within the last three or four years that it has combined the manufacturing of Roofing Slate for the home market, with the production of flagging for export to London. The flagging is bought at Valentia by a London Stone Merchant, who conveys it thither at a freight of 15s. per ton of round tonnage; and it is expected that its consumption will be limited only by the power of production. The Slate is conveyed away, as fast as it can be manufactured, by small coasters to Dingle, Castlemaine, Tralee, Kenmare, Ballylongford, Kilrush, Askeaton, &c., at freights of 4s., 5s., 6s., 7s., to 9s. respectively. It is stated that the demand for Slate has very much increased within a short period, and that the sale of this article would be six times greater if the production increased.

Appendix B.
No. 8.

Mines and Quarries.

MINES and QUARRIES WORKED BY OTHER PARTIES than the MINING COMPANY—(*continued.*)

COUNTY.	Denomination and Description.	SITUATION, &c.	Annual Produce.	Value of same.	At what Port Shipped.
¶KILKENNY (a) .	Collieries, the old 3 feet bed.	Castlecomer, Clough and Newtown.	TONS. Coal, 42,554 Culm, 53,354	15*s.* to 20*s.* per ton 4*s.* to 5*s.* per ton.	None shipped.
	Beds of Culm & Coal from 10 to 18 inches thick, the greater portion of which is sold as Culm.	Feroda.	2,500	6*s.* 8*d.* per ton	
		Callylihane, Wolf-hill, Clogrenna, Carnafea.	16,000	4*s.* per ton.	
		The Rushes, Dromagh, Tolerton, Ardategle, Courleane.	Not worked at present.	—	
*KING'S CO. (b) .	The Seven Churches Quarry produces a shell grey Marble, variously tinted, and of a sound useful description.	Seven Churches, about a quarter of a mile from the river Shannon.	Not known.	Not known.	—
LEITRIM AND ROSCOMMON, (c)	Arigna Mines and Quarries produce Iron, Coal, and Limestone.	The Mines & Quarries of this District extend along the western side of Lough Allen, over an area of 20,000 acres of Coal, equal to 20,000,000 tons.	About 2,340	—	—
*LIMERICK (d) .	A quarry producing a fine maroon-coloured marble.	About 7 miles from the city of Limerick, near the Askeaton road.	The Quarry has not been opened to any extent.	—	—
*LIMERICK (e) .	Lyons, Ballysimon, and Gullogue Quarries, &c. produce black Marble, to be had of any size, and to any extent.	In or about the city of Limerick.	Not known.	Not known.	Used at home for building.
*TIPPERARY (f)	Dromineer Quarry produces a dove-coloured shell Marble, in great quantity.	Dromineer, Lough Derg	—	—	—
*TIPPERARY . (g)	Castlebegs Quarry produces a dull black Marble.	Castlebegs, on Lough Derg.	—	—	—
†TIPPERARY (h)	Slieve Arda Collieries.	Near Killenaule.	20.000	10*s.* per ton.	—
†TYRONE . .	Dromglass Colliery.	Near Dungannon.	Not known.	Not known.	—
†TYRONE . .	Coal-Island Colliery.	Near Dungannon.	Not known.	Not known.	—
†WICKLOW (i) .	Ballymurtha Copper Mine.	Near Rathdrum.	5,000 to 6,000	£4 per ton.	Wicklow.
†WICKLOW (i) .	Cronebane and Tygroney Copper Mines.	Near Rathdrum.	4,000 to 5,000	£4 per ton.	Wicklow.
†WICKLOW (i) .	Connoree Copper Mine.	Near Rathdrum.	1,000 to 1,500	£5 per ton.	Wicklow.
†WICKLOW (i) .	Ballygahan Copper Mine	Near Rathdrum.	200 to 300	£4 per ton.	Wicklow.
†WICKLOW (i) .	Glenmalur Lead Mine.	Near Rathdrum.	160 to 200	£15 per ton.	Wicklow.

* Information furnished by Mr. W. H. Owen. † Information furnished by Mr. Purdy.

¶ Information furnished by Mr. D. Aher.

(a) None of the produce of these Collieries is shipped, the greater portion being consumed in the neighbouring counties of Wexford, Carlow, Wicklow, Kilkenny, and Queen's County.

(b) About 3,000 cube feet of this Marble were sent to the Killaloe Works—the principal consumers of Marble in the counties of Limerick, Galway and Tipperary.

(c) It is stated that the produce of the furnace in blast, is from forty to fifty tons of Metal per week, but in the course of three or four months a second furnace is to be worked, when the produce will amount to about sixty tons per week, and Bar Iron will be manufactured. The freights are as follows:—from the works to the canal at Drumshambo, 2*s.* per ton.—From Drumshambo, by the canal, to Dublin, 7*s.* 6*d.*—Tolls payable to the Royal Canal Company, 1*s.*, and Lockage on the Shannon, 6*d.*—Total expenses of forwarding each ton to Dublin, 11*s.*

(d) The Marble of this Quarry, which can be had of any size and to any extent, has not been used until lately by Lord Clarina in building his Castle.

(e) The annual produce of these Quarries, or the value thereof, cannot be ascertained. It is of an inferior description, and, as Marble, of little value; it is principally used for building. Ten blocks of this Marble were some years ago sent to London, which is considered the extent of the shipments of this article.

(f) Opened for Specimens only. (g) Opened for Specimens only.

(h) The Slieve Arda Collieries are worked by steam, and employ from 200 to 300 men. The Coal and Culm of each district is generally conveyed on cars, for supply of a circuit extending thirty to forty miles from the Collieries. Supplies of native Timber nearly sufficient in the Coal districts.

(i) The Ballymurtha Copper Mine is worked by steam, and employs from 200 to 300 men; the Cronebane and Tygroney Copper Mines, by water, and employ from 250 to 400 men; the Connoree Copper Mine, by steam, and employs from 100 to 150 men; and the Ballygahan Copper, and Glenmalur Lead Mines are worked by water, and employ between 20 and 30 men each. The Ores are conveyed on cars to Wicklow, distant ten miles. The supplies of Timber, Iron, &c. are conveyed on cars from Wicklow, unless when a fall of native Timber affords a supply.

APPENDIX B. No. 9.

RETURN OF THE TONNAGE AND ESTIMATED VALUE

OF THE

EXPORTS AND IMPORTS OF THE SEVERAL PORTS IN IRELAND,

IN THE YEAR 1835;

INCLUDING THE COASTING TRADE.

Appendix B.
No. 9.
Exports and Imports,
1835.

1.—ARDGLASS AND KILLOUGH.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Kelp	tons	81	81	0	243	0	0
Corn	tons	5,099	5,099	0	21,770	0	0
Butter	cwts.	1	0	1	4	0	0
Potatoes	cwts.	88,460	4,423	0	8,846	0	0
Flax and Tow	cwts.	240	12	0	768	0	0
Eggs	number	1,200	-	9	2	0	0
Linen	yards	390	-	1	29	0	0
Cows and Oxen	head	655	218	6	3,275	0	0
Horses	head	14	7	0	224	0	0
Total		. .	. .		35,161	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	4,088	4,088	0	2,860	0	0
Salt	bushels	1,280	32	0	75	0	0
Tinned Plates	boxes	12	2	0	15	0	0
Glass and Earthen Ware	packages	10	2	0	20	0	0
Total		. .	. .		2,970	0	0

2.—ARKLOW.

ARTICLES.		QUANTITY.			ESTIMATED VALUE		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Corn	tons	548	548	0	447	0	0
Copper Ore	cwts.	8,180	409	0	2,863	0	0
Herrings	barrels	100	16	13	130	0	0
Beer	gallons	1,260	5	12	37	0	0
Sheep	head	60	2	0	120	0	0
Swine	head	40	2	13	80	0	0
Total		. .	. .		3,677	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	4,186	4,186	0	4,186	0	0
Iron	tons	58	58	0	696	0	0
Stones, Slate	tons	110	110	0	186	0	0
Oatmeal	cwts.	1,020	51	0	510	0	0
Tallow	cwts.	8	0	8	14	18	0
Sugar	cwts.	107	5	7	289	12	0
Sugar, British refined	cwts.	10	0	10	40	0	0
Salt	bushels	2,160	54	0	108	0	0
Tea	lbs.	480	0	4	120	0	0
Wines	gallons	855	3	16	513	0	0
Spirits	gallons	330	1	5	99	0	0
Total		. .	. .		6,762	10	0

3.—BALBRIGGAN.

ARTICLES.		QUANTITY.			ESTIMATED VALUE		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Corn, Meal, and Flour	tons	645	645	0	5,417	10	0
Total		. .	. .		5,417	10	0
IMPORTED.							
Coals, Culm, and Cinders	tons	11,373	11,373	0	8,064	5	2
Bark, Oak for Tanners	tons	20	20	0	200	0	0
Potatoes	cwts.	22,160	1,108	0	2,760	0	0
Salt	bushels	14,040	351	0	367	14	0
Total		. .	. .		11,391	19	2

Appendix B.
No. 9.

Exports and Imports, 1835.

4.—BALLINA.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Kelp	tons	40	40	0	150	0	0
Corn and Meal	cwts.	176,790	8,839	10	51,000	0	0
Provisions	cwts.	9,068	453	8	19,108	0	0
Feathers	cwts.	120	6	0	60	0	0
Hides, untanned	number	250	6	5	250	0	0
Total		. .	. .		70,568	0	0
IMPORTED.							
Coal, Culm, and Cinders	tons	600	600	0	350	0	0
Iron, British	tons	100	100	0	500	0	0
Iron, Foreign	tons	60	60	0	1,160	0	0
Stones, Slate	tons	200	200	0	150	0	0
Wood, Mahogany	tons	10	10	0	40	0	0
Wheat	quarters	477	119	5	800	0	0
Sugar, British refined	cwts.	200	10	0	1,000	0	0
Sugar	cwts.	500	25	0	2,000	0	0
Coffee	lbs.	224	0	2	22	0	0
Pepper	lbs.	200	0	2	10	0	0
Fish, Herrings	barrels	1,700	283	6	1,700	0	0
Salt	bushels	8,000	200	0	200	0	0
Spirits	gallons	1,200	5	7	450	0	0
Spirits, British	gallons	3,000	13	8	1,200	0	0
Cotton Manufactures	packages	100	16	13	1,000	0	0
Woollen ditto	packages	100	16	13	2,000	0	0
Wrought Iron and Hardware	packages	50	8	6	250	0	0
Glass and Earthenware	packages	80	13	6	600	0	0
Tinned Plates	boxes	60	10	0	100	0	0
Total		. .	. .		13,532	0	0

5.—BALLYRAINE CREEK.*

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Corn	quarters	18,103	3,197	16	20,083	0	0
Butter	cwts.	28	1	8	112	0	0
Hides and Calf Skins untanned	number	1,852	46	6	444	0	0
†Other articles	value	. .	. .		195	0	0
Total		. .	. .		20,834	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	518	518	0	439	0	0
Iron	tons	119	119	0	952	0	0
Cast Iron	tons	4	4	0	52	0	0
Stones, Slate	tons	229	229	0	687	0	0
Bark, Oak for Tanners	tons	82	82	0	984	0	0
Ashes	cwts.	24	1	4	30	0	0
Barilla	cwts.	21	1	1	16	0	0
Potatoes	cwts.	782	39	2	78	0	0
Sugar	cwts.	72	3	12	216	0	0
Fish, Herrings	barrels	524	87	13	524	0	0
Salt	bushels	17,440	436	0	598	0	0
Glass and Earthenware	packages	12	2	0	45	0	0
†Other articles	value	. .	. .		1,149	0	0
Total		. .	. .		5,770	0	0

* Ballyraine is a small creek that runs up within one mile of the town of Letterkenny, in the county of Donegal.

† Under these heads are returned all articles of Export and Import not enumerated above, viz:—Starch, Rags, Soap, Poultry, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c. &c. &c.

Appendix B.
No. 9.
Exports and Imports,
1835.

6.—BALLYCASTLE CREEK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Kelp	tons	109	109	0	436	0	0
Corn and Meal	tons	179	179	0	859	0	0
Potatoes	cwts.	4,020	201	0	352	0	0
Cows and Oxen	head	35	11	13	140	0	0
Calf Skins, untanned	number	96	2	8	4	0	0
Total		. .	.	.	1,791	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	148	148	0	89	0	0
Iron	tons	67	67	0	708	0	0
Cast Iron	tons	10	10	0	125	0	0
Stones, Slate	tons	260	260	0	528	0	0
Bark, Oak for Tanners	tons	27	27	0	239	13	3
Salt	bushels	4,800	120	0	200	0	0
Tinned Plates	boxes	18	3	0	36	0	0
*Other Articles,	value	. .	.	.	105	0	0
Total		. .	.	.	2,030	13	3

7.—BALLYSHANNON.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Oats,	quarters	10,764	1,794	0	11,130	0	0
Total		—	—		11,130	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	1,225	1,225	0	1,195	0	0
Iron	tons	80	80	0	330	0	0
Stones, Slate	tons	310	310	0	827	0	0
Bark, Oak for Tanners	tons	72	72	0	608	0	0
Corn, Meal, and Flour	tons	354	354	0	2,938	0	0
Sugar	cwts.	485	24	5	1,236	0	0
Tea	lbs.	1,238	0	11	227	0	0
Glass and Earthenware	packages	72	12	0	364	0	0
*Other Articles	value	. .	.	.	1,799	0	0
Total		. .	.	.	9,524	0	0

8.—BALTIMORE, embracing CASTLETOWNSEND, GLENDORE, and ROSS.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Corn, Flour, and Meal	tons	5,681	5,681	0	32,872	0	0
Potatoes	cwts.	17,900	895	0	782	0	0
Copper Ore	cwts.	1,700	85	0	680	0	0
Swine	head	107	7	3	160	0	0
*Other Articles	value	. .	.	.	2,650	0	0
Total		. .	.	.	37,144	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	697	697	0	697	0	0
Iron	tons	113	113	0	1,800	0	0
Sugar, British Refined	cwts.	130	6	10	421	0	0
Sugar	cwts.	968	48	8	2,710	0	0
Tea	lbs.	15,200	6	16	2,280	0	0
Coffee	lbs.	12,320	5	10	924	0	0
Fish, Herrings	barrels	400	66	13	440	0	0
Salt	bushels	4,736	118	8	240	0	0
Spirits	gallons	14,800	66	0	4,146	0	0
Spirits, Rum	gallons	240	1	1	168	0	0
Wine	gallons	1,300	6	0	1,000	0	0
*Other Articles	value	. .	.	.	2,941	0	0
Total		. .	.	.	17,767	0	0

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* Under these heads are returned all articles of Export and Import not enumerated above, viz.—Starch, Rags, Soap, Poultry, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c. &c.

Appendix B.
No. 9.

Exports and Imports, 1835.

9.—BANTRY CREEK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
Exported.							
Corn	quarters	5,060	1,143	0	6,212	0	0
Total		. .	.	.	6,212	0	0
Imported.							
Coals, Culm, and Cinders	tons	205	205	0	184	10	0
Iron	tons	54	54	0	387	0	0
Cast Iron	tons	5	5	0	67	0	0
Meal and Flour	cwts.	100	5	0	40	0	0
Potatoes	cwts.	1,200	60	0	100	0	0
Sugar, British Refined	cwts.	142	7	2	596	8	0
Sugar	cwts.	511	25	11	1,533	0	0
Tea	lbs.	3,652	1	12	913	0	0
Coffee	lbs.	2,581	1	3	194	0	0
Tobacco	lbs.	37,744	16	17	6,903	0	0
Fish, Herrings	barrels	100	16	13	100	0	0
Salt	bushels	14,200	355	0	369	0	0
Spirits	gallons	17,475	78	0	5,242	10	0
Wrought Iron, and Hardware	packages	12	2	0	84	0	0
Glass, and Earthenware	packages	21	3	10	147	0	0
*Other Articles	value	. .	.	.	433	0	0
Total		. .	.	.	17,293	8	0

10.—BEREHAVEN CREEK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
Exported.							
Corn	quarters	3,200	623	6	4050	0	0
Butter	cwts.	3,214	160	14	9,000	0	0
Copper Ore	cwts.	126,900	6,345	0	63,450	0	0
Hides and Calf Skins, untanned	number	700	17	10	510	0	0
*Other Articles	value	. .	.	.	350	0	0
Total		. .	.	.	77,360	0	0
Imported.							
Coals, Culm, and Cinders	tons	2,066	2,066	0	2,066	0	0
Iron	tons	265	265	0	3,975	0	0
Meal and Flour	cwts.	3,000	150	0	3,000	0	0
Potatoes	cwts.	4,999	249	19	1,111	0	0
Sugar, British Refined	cwts.	27	1	7	129	0	0
Sugar	cwts.	774	38	14	2,167	0	0
Barilla	cwts.	1	0	1	20	0	0
Tea	lbs.	1,398	0	12	314	0	0
Coffee	lbs.	1,140	0	10	95	0	0
Pepper	lbs.	95	0	0	8	0	0
Tobacco	lbs.	3,564	1	11	593	0	0
Indigo	lbs.	277	1	2	111	0	0
Salt	bushels	2,080	52	0	182	0	0
Wines	gallons	716	3	4	215	0	0
Spirits	gallons	14,953	66	15	4,486	0	0
Woollen Manufactures	packages	44	7	6	1,949	0	0
Haberdashery and Apparel	packages	30	5	0	300	0	0
*Other Articles	value	. .	.	.	9,360	0	0
Total		. .	.	.	30,081	0	0

11.—BELMULLET CREEK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
Exported.							
Corn	cwts.	10,896	544	16	2,940	0	0

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* Under these heads are returned all articles of Export and Import not enumerated above, viz.—Starch, Rags, Soap, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c.

Appendix B.
No. 9.

Exports and Imports,
1835.

12.—BELFAST.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Lead Ore . .	tons	650	650	0	7,800	0	0
Corn, Meal, and Flour .	cwts.	285,953	14,297	13	148,597	0	0
Provisions . .	cwts.	340,226	17,011	6	906,597	0	0
Potatoes . . .	cwts.	58,480	2,924	0	4,386	0	0
Hemp . . .	cwts.	1,805	90	5	2,627	0	0
Linen Yarn . .	cwts.	43,525	2,176	5	40,360	0	0
Feathers, Flax, and Tow .	cwts.	73,652	3,682	12	186,884	0	0
Molasses . . .	cwts.	361	18	1	370	4	6
Sugar . . .	cwts.	2,150	107	10	7,929	12	6
Tea . . .	lbs.	1,820	0	16	364	0	0
Coffee . . .	lbs.	14,378	6	8	1,090	1	6
Tobacco . . .	lbs.	42,679	19	1	7,418	1	6
Wool . . .	lbs.	8,200	3	13	615	0	0
„ Cotton .	lbs.	16,400	7	6	1,620	0	0
Cotton Yarn . .	lbs.	8,500	3	16	850	0	0
Wine . . .	gallons	13,867	61	18	9,638	2	0
Rum . . .	gallons	1,938	8	12	1,210	19	0
Spirits . . .	gallons	55,300	247	0	8,304	0	0
Beer . . .	gallons	14,040	62	13	702	0	0
Cotton Manufactures .	packages	7,363	1,227	3	146,260	0	0
Linen . . .	yards	53,881,000	8,980	3	2,694,000	0	0
Cows and Oxen . .	head	1,860	620	0	13,020	0	0
Horses . . .	head	2,374	1,187	0	35,580	0	0
Swine . . .	head	4,500	300	0	4,500	0	0
Eggs . . .	number	2,850,000	101	16	5,930	0	0
Hides and Calf Skins, untanned	number	5,189	129	14	2,595	0	0
*Other Articles . .	value	. .	.	.	102,546	2	7
Total . .		. .	.	.	4,341,794	3	7
IMPORTED.							
Coals, Culm, and Cinders .	tons	141,250	141,250	0	141,250	0	0
Iron, (unwrought) . .	tons	1,250	1,250	0	12,500	0	0
Cast Iron . .	tons	4,800	4,800	0	57,600	0	0
Lead, (unwrought) .	tons	380	380	0	8,200	0	0
Stones, slate . .	tons	5,100	5,100	0	10,200	0	0
Wood, Mahogany . .	tons	111	111	0	3,966	0	0
Bark, Oak for Tanners .	tons	1,480	1,480	0	13,220	0	0
Corn, Malt, Meal, and Flour	cwts.	255,800	12,790	0	92,690	0	0
Hops . . .	cwts.	4,360	218	0	26,160	0	0
Sugar . . .	cwts.	34,146	1,707	6	134,178	2	3
Sugar, British Refined .	cwts.	10,400	520	0	41,600	0	0
Pork . . .	cwts.	350	17	10	825	0	0
Tallow . . .	cwts.	16,452	822	12	36,194	0	0
Hides . . .	cwts.	3,235	161	15	5,660	0	0
Brass and Copper . .	cwts.	2,800	140	0	14,000	0	0
Ashes . . .	cwts.	4,132	206	12	8,264	0	0
Woollen Yarn . .	lbs.	11,200	5	0	1,320	0	0
Linen Yarn . .	lbs.	1,250,000	558	10	960,000	0	0
Cotton Yarn . .	lbs.	450,000	200	17	33,750	0	0
Wool, Cotton . .	lbs.	1,924,160	859	0	128,277	0	0
Tea . . .	lbs.	1,204,750	537	16	274,134	11	0
Coffee . . .	lbs.	28,850	12	17	2,433	13	0
Pepper . . .	lbs.	78,037	34	16	8,146	4	1
Tobacco . . .	lbs.	538,754	240	10	94,229	1	0
Indigo . . .	lbs.	7,470	3	6	1,867	0	0
Fish, Herrings . .	barrels	23,500	3,916	13	26,500	0	0
Salt . . .	bushels	460,000	11,500	0	9,200	0	0
Seeds, Flax . .	bushels	108,816	2,720	8	11,935	0	0
Beer and Ale .	tuns	115	115	0	970	0	0
Wines . . .	gallons	26,589	118	14	14,640	9	9
Rum . . .	gallons	9,775	43	12	6,103	2	6
Spirits . . .	gallons	95,400	426	2	15,560	0	0
Leather . . .	packages	860	143	6	12,540	0	0
Cotton Manufactures .	packages	4,900	816	13	245,000	0	0
Woollen Manufactures .	packages	5,200	866	13	480,000	0	0
Wrought Iron and Hardware	packages	6,400	1,066	13	32,000	0	0
Machinery and Millwork .	packages	1,150	191	13	38,500	0	0
Glass and Earthenware .	packages	2,080	346	13	14,560	0	0
Haberdashery and Apparel .	packages	3,760	626	13	188,000	0	0
Tinned Plates . .	boxes	2,000	333	6	5,000	0	0
Linens . . .	yards	338,500	56	8	17,700	0	0
*Other Articles . .	value	. .	.	.	466,564	8	3
Total . .		. .	.	.	3,695,437	11	10

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* Under these heads are returned all articles of Export and Import not enumerated above, viz :—Starch, Rags, Soap, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c. &c. &c.

Appendix B.
No. 9.
Exports and Imports, 1835.

13.—CLARE CREEK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
Exported.							
Corn, Meal, and Flour .	tons	3,067	3,067	0	16,617	0	0
Total . .		. .	.	.	16,617	0	0
Imported.							
Coals, Culm, and Cinders .	tons	1,671	1,671	0	1,522	0	0
Wrought Iron, and Hardwares .	packages	39	6	10	150	0	0
Total . .		. .	.	.	1,672	0	0

14.—COLERAINE AND PORTRUSH.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwts.	£	s.	d.
Exported.							
Corn, Meal, and Flour .	tons	5,137	5,137	0	40,954	0	0
Provisions . .	cwts.	17,465	873	5	42,527	0	0
Flax and Tow .	cwts.	1,820	91	0	4,950	0	0
Eggs . . .	boxes	9	0	18	27	0	0
Linen . . .	boxes	128	21	6	5,120	0	0
Wool . . .	bales	22	6	12	1,100	0	0
Linen Yarn . .	bales	4	2	0	200	0	0
Spirits . . .	gallons	500	2	4	120	0	0
Hides, untanned . .	number	657	16	8	493	0	0
Sheep . . .	head	78	2	7	150	0	0
Swine . . .	head	22	1	10	44	0	0
Other Articles . .	value	. .	.	.	10,000	0	0
Total . .		. .	.	.	105,685	0	0
Imported.							
Coals, Culm, and Cinders .	tons	3,777	3,777	0	3,500	0	0
Iron, unwrought .	tons	470	470	0	5,600	0	0
Cast Iron . .	tons	500	500	0	6,250	0	0
Lead, unwrought .	tons	41	41	0	1,200	0	0
Stones, Slate . .	tons	724	724	0	2,170	0	0
Salt . . .	tons	977	977	0	1,000	0	0
Bark, Oak for Tanners .	tons	289	289	0	2,890	0	0
Wood, Mahogany . .	tons	8	8	0	160	0	0
Hops . . .	cwts.	15	0	15	75	0	0
Sugar, British refined .	cwts.	120	6	0	500	0	0
Brass and Copper . .	cwts.	10	0	10	60	0	0
Tin . . .	cwts.	20	1	0	140	0	0
Hides . . .	cwts.	120	6	0	240	0	0
Coffee . . .	lbs.	500	0	4	40	0	0
Beer and Ale . .	hhds.	30	8	0	120	0	0
Sugar . . .	hhds.	150	112	10	6,000	0	0
Tallow . . .	hhds.	8	5	16	136	0	0
Fish, Herrings . .	barrels	4,000	666	13	6,000	0	0
Ashes . . .	barrels	430	53	15	1,015	0	0
Seeds, Flax . .	bushels	840	18	0	378	0	0
Wines . . .	gallons	400	1	15	600	0	0
Spirits, British . .	gallons	1,500	6	13	900	0	0
Spirits, Rum . .	gallons	100	0	9	75	0	0
Tinned Plates . .	boxes	145	24	3	365	0	0
Tea . . .	chests	100	3	12	1,800	0	0
Linen Yarn . .	bales	200	100	0	2,200	0	0
Leather . . .	packages	7	1	3	10	0	0
Cotton Manufactures .	packages	20	3	6	2,000	0	0
Woollen Manufactures .	packages	150	25	0	15,000	0	0
Wrought Iron and Hardware	packages	150	25	0	3,000	0	0
Machinery and Millwork .	packages	10	1	13	200	0	0
Glass and Earthenware .	packages	218	36	6	2,200	0	0
Linen . . .	yards	500	0	2	50	0	0
Horse . . .	head	1	0	10	20	0	0
Cow . . .	head	1	0	6	6	0	0
Total . .		. .	.	.	65,900	0	0

Appendix B.
No. 9.

Exports and Imports, 1835.

15.—CORK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
EXPORTED.							
Corn, Meal, and Flour	cwts.	729,372	36,468	12	372,854	0	0
Provisions	cwts.	581,530	29,076	10	2,019,846	0	0
Sugar	cwts.	560	28	0	1,400	0	0
Feathers	cwts.	2,381	119	1	10,958	0	0
Tea	lbs.	5,600	2	10	700	0	0
Coffee	lbs.	1,008	0	9	67	0	0
Tobacco	lbs.	20,100	8	19	502	0	0
Wool	lbs.	21,952	9	16	1,646	0	0
Wine	gallons	35,890	160	4	10,767	0	0
Spirits	gallons	104,680	467	6	38,085	0	0
Beer	gallons	234,000	1,044	12	7,795	0	0
Eggs	boxes	10,686	1,068	12	31,000	0	0
Linen	yards	501,600	83	12	50,160	0	0
Oxen and Cows	head	4,236	1,412	0	42,360	0	0
Horses	head	123	61	10	2,460	0	0
Sheep	head	7,539	228	9	11,310	0	0
Swine	head	75,189	5,012	12	263,162	0	0
Hides and Calf Skins, untanned	number	7,143	178	11	3,924	0	0
*Other Articles	value	. .	.	.	40,850	0	0
Total		. .	.	.	2,909,846	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	115,614	115,614	0	103,261	0	0
Iron, unwrought	tons	4,598	4,598	0	21,588	0	0
Lead, unwrought	tons	462	462	0	6,930	0	0
Stones, Slate	tons	1,965	1,965	0	11,790	0	0
Wood, Mahogany	tons	154	154	0	770	0	0
Bark, Oak for Tanners	tons	1,244	1,244	0	11,196	0	0
Corn, Malt	cwts.	132	6	12	132	0	0
Hops	cwts.	3,445	172	5	22,399	0	0
Sugar, British refined	cwts.	11,822	591	2	53,281	0	0
Sugar, Foreign	cwts.	29,183	1,459	3	88,529	0	0
Tallow	cwts.	2,984	149	4	6,863	0	0
Brass and Copper, unwrought	cwts.	1,780	89	0	9,790	0	0
Tin, unwrought	cwts.	280	14	0	1,400	0	0
Ashes	cwts.	840	42	0	960	0	0
Hides	cwts.	48,145	2,407	5	120,356	0	0
Indigo	lbs.	47,040	21	0	11,760	0	0
Tea	lbs.	613,760	274	0	61,375	0	0
Coffee	lbs.	204,064	91	2	5,950	0	0
Pepper	lbs.	71,456	31	18	1,190	0	0
Tobacco	lbs.	627,750	280	4	15,693	0	0
Wool, Woollen Yarn, Linen Yarn, Cotton Yarn	lbs.	101,842	45	9	10,090	0	0
Wool and Cotton	lbs.	40,320	18	0	1,512	0	0
Fish, Herrings	barrels	15,573	2,595	10	15,573	0	0
Salt	bushels	173,280	4,332	0	10,830	0	0
Seeds, Flax	bushels	2,055	44	0	820	0	0
Beer and Ale	tuns	100	100	0	800	0	0
Wines	gallons	56,740	253	6	17,022	0	0
Spirits, Rum	gallons	16,605	74	2	2,075	0	0
Tinned Plates	boxes	1,847	307	18	4,617	0	0
Wrought Iron and Hardwares	packages	877	146	3	43,680	0	0
Glass and Earthenware	packages	3,358	559	13	67,160	0	0
Cotton and Woollen Manufactures	packages	7,369	1,228	3	889,287	0	0
Haberdashery and Apparel	packages	1,550	258	6	271,000	0	0
Leather	packages	1,117	186	3	16,755	0	0
*Other Articles	value	. .	.	.	845,250	0	0
Total		. .	.	.	2,751,684	0	0

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* Under these heads are returned all articles of Export and Import not enumerated above. viz. :—Starch, Rags, Soap, Poultry, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c. &c. &c.

Appendix B.
No. 9.

Exports and Imports, 1835.

16.—DONAGHADEE CREEK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
EXPORTED.							
Wheat	tons	51	51	0	450	0	0
Potatoes	cwts.	86,580	4,329	0	4,885	0	0
Linen	yards	10,000	1	13	1,000	0	0
Cows and Oxen	head	13,240	4,413	6	50,179	0	0
Horses	head	450	225	0	5,620	0	0
*Other articles	value	. .	.	.	350	0	0
Total		. .	.	.	62,484	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	5,186	5,186	0	3,370	0	0
Cast Iron	tons	22	22	0	150	0	0
Fish, Herrings	barrels	1,000	166	14	1,250	0	0
Salt	bushels	3,200	80	0	100	0	0
Glass and Earthenware	packages	21	3	10	150	0	0
*Other Articles	value	. .	.	.	2,550	0	0
Total		. .	.	.	7,570	0	0

17.—DONEGAL CREEK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
EXPORTED.							
Corn	cwts.	32,374	1,618	14	10,584	0	0
Butter	cwts.	63	3	3	250	0	0
*Other Articles	value	. .	.	.	529	0	0
Total		. .	.	.	11,363	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	598	598	0	502	0	0
Cast Iron	tons	12	12	0	29	0	0
Iron	tons	190½	190	10	1,293	0	0
Lead, unwrought	tons	7	7	0	186	0	0
Stones, Slate	tons	450	450	0	1,350	0	0
Bark, Oak for Tanners	tons	74	74	0	650	0	0
Tin, unwrought	cwts.	34	1	14	62	0	0
Sugar, British refined	cwts.	168	8	8	400	0	0
Tea	lbs.	1,680	0	15	380	0	0
Coffee	lbs.	448	0	4	80	0	0
Pepper	lbs.	448	0	4	42	0	0
Salt	bushels	35,080	877	0	1,069	0	0
Wines	gallons	600	2	12	450	0	0
Cotton Manufactures	packages	10	1	13	737	0	0
Glass and Earthenware	packages	57	9	10	326	0	0
*Other Articles	value	. .	.	.	3,775	0	0
Total		. .	.	.	11,331	0	0

* These items comprise all articles Exported and Imported not detailed in the Returns.

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18.—DROGHEDA.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwts.	£	s.	d.
EXPORTED.							
Corn, Meal, and Flour	cwts.	476,264	23,813	4	256,852	0	0
Butter	cwts.	1,500	75	0	4,000	0	0
Flax and Tow	cwts.	7,000	350	0	17,200	0	0
Sugar	cwts.	250	12	10	360	0	0
Tea	lbs.	270	0	2	40	0	0
Tobacco	lbs.	12,026	5	7	300	0	0
Wool, Cotton	lbs.	154,560	69	0	3,220	0	0
Eggs	crates	2,255	676	10	37,500	0	0
Wine	gallons	104	0	9	36	0	0
Spirits	gallons	330	1	9	120	0	0
Beer	gallons	9,400	41	19	720	0	0
Linen	yards	900,000	150	0	30,000	0	0
Cows and Oxen	head	9,216	3,072	0	136,240	0	0
Horses	head	168	84	0	2,520	0	0
Sheep	head	27,961	847	6	27,961	0	0
Swine	head	94,343	6,289	11	235,858	0	0
*Other Articles	value	. .	.	.	13,100	0	0
Total		. .	.	.	766,027	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	37,000	37,000	0	27,750	0	0
Iron, unwrought	tons	1,200	1,200	0	7,200	0	0
Cast Iron	tons	50	50	0	1,000	0	0
Lead, unwrought	tons	50	50	0	1,000	0	0
Stones, Slate	tons	1,200	1,200	0	3,000	0	0
Bark, Oak for Tanners	tons	300	300	0	2,400	0	0
Corn	cwts.	51,026	2,551	6	26.759	0	0
Flax and Tow	cwts.	230	11	10	230	0	0
Hops	cwts.	40	2	0	80	0	0
Sugar, British refined	cwts.	600	30	0	2,700	0	0
Sugar	cwts.	3,000	150	0	9,000	0	0
Barilla	cwts.	280	14	0	210	0	0
Hides	cwts.	100	5	0	100	0	0
Wool, Cotton	lbs.	209,328	93	9	4,361	0	0
Linen Yarn	lbs.	476,000	79	6	23,800	0	0
Tea	lbs.	11,600	5	3	2,320	0	0
Tobacco	lbs.	53,057	23	13	80,911	0	0
Indigo	lbs.	120	0	1	45	0	0
Fish, Herrings	barrels	3,800	633	6	3,800	0	0
Salt	bushels	104,000	2,600	0	1,300	0	0
Seeds, Flax	bushels	832	17	16	416	0	0
Wines	gallons	3,500	15	12	1,460	0	0
Woollen Manufactures	packages	300	50	0	15,000	0	0
Haberdashery and Apparel	packages	20	3	3	400	0	0
Wrought Iron and Hardwares	packages	500	83	6	2,000	0	0
Machinery and Millwork	packages	100	16	13	15,000	0	0
Glass and Earthenware	packages	1,020	170	0	5,100	0	0
Tinned Plates	boxes	500	83	6	1,000	0	0
*Other Articles	value	. .	.	.	21,512	0	0
Total		. .	.	.	259,854	0	0

* Under these heads are returned all articles of Export and Import not enumerated above, viz.:—Starch, Rags, Soap, Poultry, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c. &c. &c.

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19.—DUBLIN.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
EXPORTED.							
Corn, Meal, and Flour	cwts.	697,263	34,863	3	378,921	0	0
Provisions	cwts.	119,414	5,970	14	276,804	0	0
Potatoes	cwts.	3,620	181	0	307	0	0
Feathers, Flax, Tow, and Copper Ore	cwts.	1,960	98	0	7,278	0	0
Linen Yarn	cwts.	184	9	4	3,606	0	0
Hemp	cwts.	88	4	8	462	0	0
Sugar	cwts.	5,922	296	2	16,581	0	0
Molasses	cwts.	7,596	379	16	21,269	0	0
Coffee	lbs.	68,992	30	16	4,025	0	0
Tea	lbs.	79,200	35	7	17,820	0	0
Tobacco	lbs.	71,680	32	0	11,648	0	0
Wool	lbs.	496,384	221	12	6,204	0	0
Cotton Yarn	lbs.	8,512	3	16	638	0	0
Silk Manufactures	yards	1,200	0	4	140	0	0
Woollen Manufactures	yards	117,832	19	12	47,132	0	0
Cotton Manufactures	yards	1,268,320	211	7	15,854	0	0
Linen	yards	10,968,000	1,828	0	731,200	0	0
Wines	gallons	64,560	288	4	38,736	0	0
Rum	gallons	125	0	11	100	0	0
Spirits	gallons	150,590	672	5	45,177	0	0
Beer	gallons	2,448,992	10,933	0	122,449	0	0
Hides and Calf Skins, untanned	number	15,753	393	16	33,268	0	0
Eggs	number	11,690,000	417	10	16,236	0	0
Cows and Oxen	head	50,882	16,960	13	407,056	0	0
Horses	head	121	60	10	2,190	0	0
Sheep	head	68,655	2,080	9	123,579	0	0
Swine	head	41,321	2,754	14	123,963	0	0
*Other Articles	value	. .	.	.	75,900	0	0
Total		. .	.	.	2,528,543	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	349,230	349,230	0	244,461	0	0
Iron	tons	503	503	0	9,848	0	0
Wood, Mahogany	tons	465	465	0	10,695	0	0
Corn, Meal, and Flour	cwts.	314,891	15,744	11	147,528	0	0
Corn, Malt, &c.	cwts.	13,533	676	13	4,395	0	0
Potatoes	cwts.	90,100	4,505	0	7,530	0	0
Hops	cwts.	2,912	145	12	24,460	0	0
Ashes	cwts.	3,410	170	10	5,967	0	0
Barilla	cwts.	51	2	11	51	0	0
Hides	cwts.	7,318	365	18	2,561	0	0
Tallow	cwts.	7,800	390	0	9,800	0	0
Sugar	cwts.	38,732	1,936	12	108,449	0	0
Wool	lbs.	611,936	273	3	35,696	0	0
Indigo	lbs.	17,808	7	19	6,678	0	0
Silks, raw and thrown	lbs.	9,072	4	1	5,292	0	0
Wool, Cotton	lbs.	329,504	147	2	8,237	0	0
Wool, Sheeps'	lbs.	155,008	69	4	11,625	0	0
Coffee	lbs.	832,160	371	10	48,542	0	0
Tea	lbs.	2,349,600	1,048	18	528,660	0	0
Pepper	lbs.	102,300	45	13	6,820	0	0
Tobacco	lbs.	1,947,120	869	5	316,407	0	0
Salt	bushels	98,120	2,453	0	3,679	0	0
Seeds, Flax	bushels	41,594	891	6	24,956	0	0
Machinery and Millwork	packages	530	88	6	2,650	0	0
Wines	gallons	157,360	702	10	94,416	0	0
Spirits, Rum	gallons	6,448	28	14	5,158	0	0
Spirits, British	gallons	174,200	777	13	52,260	0	0
*Other Articles	value	. .	.	.	2,703,500	0	0
Total		. .	.	.	4,430,321	0	0

* Under these heads are returned all articles of Export and Import not enumerated above, viz..—Starch, Rags, Soap, Poultry, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c. &c. &c.

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20.—DUNDALK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
Exported.							
Corn, Meal, and Flour	cwts.	605,236	30,261	16	279,743	0	0
Provisions	cwts.	10,580	529	0	46,160	0	0
Flax and Tow	cwts.	5,000	250	0	12,000	0	0
Wool	lbs.	15,680	7	0	980	0	0
Linen	yards	60,000	10	0	4,500	0	0
Eggs	number	2,410,800	86	0	5,430	0	0
Cows and Oxen	head	3,932	1,310	13	20,000	0	0
Horses	head	100	50	0	1,000	0	0
Sheep	head	7,266	220	4	10,000	0	0
Swine	head	48,183	3,212	4	70,000	0	0
*Other Articles	value	. .	.	.	3,000	0	0
Total,		. .	.	.	452,813	0	0
Imported.							
Coals, Culm, and Cinders	tons	25,363	25,363	0	19,021	0	0
Iron, unwrought	tons	1,000	1,000	0	7,000	0	0
Cast Iron	tons	200	200	0	1,600	0	0
Iron	tons	30	30	0	360	0	0
Lead, unwrought	tons	20	20	0	300	0	0
Stones, slate	tons	976	976	0	2,800	0	0
Bark, Oak for Tanners	tons	600	600	0	4,800	0	0
Wood, Mahogany	ton	1	1	0	8	0	0
Corn, Meal, and Flour	cwts.	31,398	1,569	18	14,692	0	0
Sugar	cwts.	600	30	0	2,100	0	0
Tallow	cwts.	80	4	0	180	0	0
Hides	cwts.	300	15	0	625	0	0
Ashes	cwts.	140	7	0	300	0	0
Tea	lbs.	5,590	2	10	1,400	0	0
Coffee	lbs.	2,200	0	19	165	0	0
Pepper	lbs.	1,300	0	12	130	0	0
Fish, Herrings	barrels	7,000	1,166	13	7,000	0	0
Salt	bushels	3,200	80	0	160	0	0
Seeds, Flax	bushels	4,000	85	14	2,000	0	0
Wines	gallons	350	1	11	262	0	0
Spirits, British	gallons	500	2	4	250	0	0
Tinned Plates	boxes	1,000	166	13	2,500	0	0
Cotton Manufactures	packages	138	23	0	13,800	0	0
Woollen Manufactures	packages	105	17	10	10,500	0	0
Haberdashery and Apparel	packages	120	20	0	6,500	0	0
Wrought Iron and Hardwares	packages	100	16	13	2,000	0	0
Machinery and Millwork	packages	25	4	3	1,500	0	0
Glass and Eartbenware	packages	254	42	6	1,000	0	0
*Other Articles	value	. .	.	.	5,000	0	0
Total,		. .	.	.	107,953	0	0

* These items comprise all articles Exported and Imported not detailed in the Returns.

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21.—DUNGARVAN.

ARTICLES.		QUANTITY.			ESTIMATED VALUE		
		Number.	Tons.	Cwts.	£	s.	d.
EXPORTED.							
Corn	cwts.	97,224	4,861	4	25,860	0	0
Provisions	cwts.	13,359	667	19	18,311	0	0
Copper Ore	cwts.	26,800	1,340	0	20,000	0	0
Beer	gallons	5,250	23	8	195	0	0
Cows and Oxen	head	215	71	13	1,500	0	0
Sheep	head	210	6	6	220	0	0
Swine	head	1,498	99	16	3,000	0	0
*Other Articles	value	. .	.	.	400	0	0
Total		. .	.	.	69,486	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	9,877	9,877	0	7,409	15	0
Iron	tons	280	280	0	2,300	0	0
Bark, Oak for Tanners	tons	100	100	0	675	0	0
Sugar	cwts.	90	4	10	300	0	0
Tea	lbs.	480	0	4	108	0	0
Salt	bushels	6,010	150	4	150	0	0
Glass and Earthenware	packages	20	3	6	70	0	0
*Other Articles	value	. .	.	.	5,300	0	0
Total		. .	.	.	16,312	15	0

22.—GALWAY.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwts.	£	s.	d.
EXPORTED.†							
Kelp	tons	903	903	0	903	0	0
Corn, Meal, and Flour	cwts.	1,195,978	59,798	18	217,319	0	0
Bacon and Hams	cwts.	24,000	1,200	0	30,000	0	0
Flax and Tow	cwts.	60	3	0	150	0	0
Hides and Calf Skins, untanned	number	1,300	32	10	1,080	0	0
*Other Articles	value	. .	.	.	2,412	0	0
Total		. .	.	.	251,864	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	4,897	4,897	0	4,021	0	0
Iron	tons	1,281	1,281	0	12,986	0	0
Iron, Foreign	tons	1,281	1,281	0	12,968	0	0
Stones, Slate	tons	1,120	1,120	0	2,770	0	0
Hops	cwts.	91	4	11	470	0	0
Tallow	cwts.	35,180	1,759	0	4,180	0	0
Sugar	cwts.	3,032	151	12	8,489	12	0
Coffee	lbs.	4,436	1	19	258	15	4
Tea	lbs.	14,611	6	10	2,922	4	0
Tobacco	lbs.	109,711	48	19	18,285	3	4
Fish, Herrings	barrels	650	108	6	715	0	0
Seeds, Flax,	bushels	4,900	105	0	3,200	0	0
Salt,	bushels	1,578	39	9	2,086	0	0
Wines	gallons	19,541	87	4	9,770	0	0
Spirits, Rum,	gallons	306	1	7	198	18	0
Tinned Plates	boxes	135	22	10	301	0	0
Wrought Iron and Hardwares,	packages	35	5	16	1,925	0	0
Glass and Earthenware,	packages	474	79	0	2,822	0	0
Total		. .	.	.	88,268	12	8

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* These items comprise all articles Exported and Imported not detailed in the Returns

† The Collector of Customs at this Port was unable to give the values of the several articles of export The values assigned to them, calculated on the average values of the same articles at the nearest Ports on the Western Coast, have been assumed, in order to make the Return as complete as possible.

23.—KILLALA.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwts.	£	s.	d.
Exported.							
Corn and Meal	cwts.	78,020	3,901	0	23,692	0	0
Provisions	cwts.	1,588	79	8	2,704	0	0
Total,		. .	. .		26,396	0	0
Imported.							
Coals, Culm, and Cinders	tons	284	284	0	213	0	0
Iron	tons	18	18	0	216	0	0
Iron, Foreign	tons	8	8	0	144	0	0
Cast Iron	tons	7	7	0	63	0	0
Tin	cwts.	26	1	6	65	0	0
Sugar, British refined	cwts.	32	1	12	96	0	0
Tea	lbs.	60	-	-	15	0	0
Seeds, Flax	tierces	283	113	4	1,132	0	0
Fish, Herrings	barrels	710	118	6	710	0	0
Salt	bushels	1,440	36	0	360	0	0
Glass and Earthenware	packages	24	4	0	144	0	0
Wines	gallons	84	0	7	30	0	0
Total,		. .	. .		3,188	0	0

24.—KILRUSH.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
Exported.							
Corn, Meal, and Flour	cwts.	125,572	6,278	12	35,458	0	0
*Other Articles	value	. .	. .		700	0	0
Total,		. .	. .		36,158	0	0
Imported.							
Coals, Culm, and Cinders	tons	88	88	0	70	0	0
Potatoes	cwts.	1,800	90	0	180	0	0
Fish, Herrings	barrels	400	66	12	500	0	0
Salt	bushels	5,400	135	0	350	0	0
Wrought Iron and Hardwares	packages	144	24	0	1,544	0	0
*Other Articles	value	. .	. .		124	0	0
Total,		. .	. .		2,768	0	0

25.—KINSALE CREEK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt	£	s.	d.
Exported.							
Corn, Meal, and Flour	cwts.	18,012	900	12	9,897	0	0
Potatoes	cwts.	4,240	212	0	362	0	0
Feathers	cwts.	10	0	10	60	0	0
Cows and Oxen	head	10	3	6	70	0	0
Horses	head	6	3	0	80	0	0
Sheep	head	840	25	9	1,010	0	0
Swine	head	1,071	71	8	2,000	0	0
Total,		. .	. .		13,479	0	0
Imported.							
Coals, Culm, and Cinders	tons	13,500	13,500	0	12,150	0	0
Iron	tons	161	161	0	1,771	0	0
Corn, Meal, and Flour	cwts.	6,613	330	13	2,829	0	0
Salt	bushels	11,800	295	0	222	0	0
*Other Articles	value	. .	. .		1,290	0	0
Total,		. .	. .		18,262	0	0

* These items comprise all articles Exported and Imported not detailed in the Returns.

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26.—LARNE CREEK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwts.	£	s.	d.
Exported.							
Potatoes	tons	175	175	0	300	0	0
Corn, Meal, and Flour	cwts.	33,268	1,663	8	16,372	0	0
Provisions	cwts.	2,600	130	0	5,360	0	0
Beans	cwts.	13,720	686	0	4,277	0	0
Linen	yards	800,000	133	6	40,000	0	0
Total,		. .	.	.	66,309	0	0
Imported.							
Coals, Culm, and Cinders	tons	9,185	9,185	0	5,051	0	0
Iron, unwrought	tons	20	20	0	260	0	0
Stones, Slate	tons	167	167	0	424	6	7
Bark, Oak for Tanners	tons	100	100	0	900	0	0
Fish, Herrings	barrels	200	33	6	200	0	0
Salt	bushels	4,000	100	0	140	0	0
Earthenware	crates	40	4	0	90	0	0
Ponies	head	30	10	0	90	0	0
Swine	head	35	2	6	100	0	0
Total,		. .	.	.	7,255	6	7

27.—LIMERICK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwts.	£	s.	d.
Exported.							
Corn, Meal, and Flour	cwts.	980,015	49,000	15	380,400	0	0
Provisions	cwts.	154,115	7,705	15	337,200	0	0
Feathers	cwts.	180	9	0	900	0	0
Wine	gallons	850	3	15	470	0	0
Spirits	gallons	16,640	74	5	4,200	0	0
Beer	gallons	5,640	25	3	260	0	0
*Other Articles	value	. .	.	.	3,000	0	0
Total,		. .	.	.	726,430	0	0
Imported.							
Coals, Culm, and Cinders	tons	29,638	29,638	0	21,000	0	0
Iron, unwrought	tons	2,136	2,136	0	23,490	0	0
Cast Iron	tons	130	130	0	2,080	0	0
Lead, unwrought	tons	101	101	0	2,500	0	0
Stones, Slate	tons	316	316	0	1,000	0	0
Bark, Oak for Tanners	tons	106	106	0	900	0	0
Wood, Mahogany	tons	90	90	0	2,700	0	0
Corn, Malt	quarters	45	9	0	160	0	0
Hops	cwts.	651	32	11	2,900	0	0
Sugar, British refined	cwts.	3,000	150	0	13,800	0	0
Sugar	cwts.	7,040	352	0	23,000	0	0
Tallow	cwts.	2,040	102	0	5,900	0	0
Ashes	cwts.	720	36	0	1,260	0	0
Tea	lbs.	120,687	53	17	24,200	0	0
Coffee	lbs.	54,824	24	19	3,700	0	0
Pepper	lbs.	12,838	5	14	700	0	0
Tobacco	lbs.	401,205	179	2	71,400	0	0
Woollen Yarn	lbs.	73,000	32	11	900	0	0
Linen Yarn	lbs.	1,000	0	9	150	0	0
Indigo	lbs.	300	0	2	75	0	0
Wool, Cotton	lbs.	480	0	4	15	0	0
Fish, Herrings	barrels	23,439	3,906	10	25,800	0	0
Salt	bushels	262,000	6,550	0	8,700	0	0
Seeds, Flax	bushels	5,796	124	4	1,230	0	0
Beer and Ale	tuns	14	14	0	280	0	0
Wines	gallons	19,357	86	3	10,700	0	0
Spirits, Rum	gallons	2,124	9	9	1,260	0	0
Leather	packages	14	2	6	300	0	0
Wrought Iron and Hardware	packages	244	40	13	7,000	0	0
Glass and Earthenware	packages	682	113	13	4,500	0	0
Haberdashery and Apparel	packages	64	10	13	2,500	0	0
Woollen Manufactures	packages	35	5	17	3,000	0	0
Tinned Plates	boxes	629	104	17	1,700	0	0
*Other Articles	value	. .	.	.	55,000	0	0
Total,		. .	.	.	323,740	0	0

* Under these heads are returned all articles of Export and Import not enumerated above, viz.:—Starch, Rags, Soap, Poultry, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c. &c. &c.

Appendix B.
No. 9.
Exports and Imports, 1835.

28.—LONDONDERRY.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
EXPORTED.							
Corn, Meal, and Flour	cwts.	416,042	20,802	2	120,676	0	0
Provisions	cwts.	85,890	4,294	10	273,566	0	0
Sugar	cwts.	36	1	16	144	0	0
Flax and Tow	cwts.	81,120	4,056	0	212,940	0	0
Feathers	cwts.	3	0	3	15	0	0
Spirits	gallons	63,480	283	6	10,580	0	0
Linen	yards	5,035,992	839	6	314,749	0	0
Cotton Manufactures	yards	968	0	3	24	0	0
Oxen and Cows	head	855	285	0	5,130	0	0
Horses	head	73	36	10	1,440	0	0
Sheep	head	313	9	10	265	0	0
Swine	head	11,103	740	4	13,880	0	0
Eggs	number	33,056,000	1,180	11	55,094	0	0
Hides and Calf Skins untanned	number	22,960	574	0	11,235	0	0
*Other Articles	value				21,180	0	0
Total,					1,040,918	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	13,966	13,966	0	8,728	0	0
Iron, unwrought	tons	1,226	1,226	0	24,520	0	0
Cast Iron	tons	414	414	0	450	0	0
Lead, unwrought	tons	48	48	0	1,440	0	0
Stones, Slate	tons	1,032	1,032	0	3,096	0	0
Bark, Oak for Tanners	tons	700	700	0	7,350	0	0
Wood, Mahogany	tons	30	30	0	1,950	0	0
Corn, Malt, &c.	quarters	532	122	10	1,792	0	0
Wheatmeal and Flour	cwts.	11,910	595	10	11,910	0	0
Hops	cwts.	65	3	5	380	0	0
Sugar	cwts.	22,002	1,100	2	42,904	0	0
Sugar, British refined	cwts.	3,960	198	0	15,840	0	0
Ashes	cwts.	1,317	65	17	2,298	0	0
Barilla	cwts.	3,140	157	0	1,884	0	0
Hides	cwts.	2,070	103	10	6,095	0	0
Tallow	cwts.	3,987	199	7	9,570	0	0
Indigo	lbs.	1,245	0	11	375	0	0
Tea	lbs.	191,676	85	11	19,255	0	0
Coffee	lbs.	64,005	28	11	2,400	0	0
Pepper	lbs.	19,236	8	11	481	0	0
Tobacco	lbs.	259,646	115	18	8,213	0	0
Fish, Herrings	barrels	10,811	1,801	17	10,811	0	0
Salt	bushels	145,600	3,640	0	5,460	0	0
Seeds, Flax	bushels	27,456	588	4	16,896	0	0
Beer and Ale	tuns	176	176	0	1,056	0	0
Wines	gallons	13,124	58	11	3,364	0	0
Spirits, Rum	gallons	1,974	8	16	394	0	0
Spirits, British	gallons	130,920	584	18	21,820	0	0
Tinned Plates	boxes	1,000	166	13	2,000	0	0
Leather	packages	25	4	3	750	0	0
Wrought Irons and Hardwares	packages	577	96	3	2,885	0	0
Machinery and Millwork	packages	86	14	6	860	0	0
Glass and Earthenware	packages	1,796	299	6	8,980	0	0
Haberdashery and Apparel	packages	271	45	3	13,550	0	0
*Other Articles	value				448,297	0	0
Total,					708,054	0	0

29.—NEWCASTLE CREEK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
EXPORTED.							
Potatoes	tons	130	130	0	260	0	0
Flax	tons	7	7	0	17	10	0
Cows and Oxen	head	836	278	13	3,344	0	0
Swine	head	30	2	0	60	0	0
Total					3,681	10	0
IMPORTED.							
Coals, Culm, and Cinders	tons	2,987	2,987	0	2,090	0	0
Stones, Slate	tons	32	32	0	288	0	0
Iron	tons	40	40	0	350	0	0
Fish, Herrings	barrels	13	2	3	18	0	0
Salt	bushels	4,000	100	0	350	0	0
Glass and Earthenware	packages	10	1	16	60	0	0
Total,					3,156	0	0

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* Under these heads are returned all Articles of Export and Import not enumerated above, viz.:—Starch, Rags, Soap, Poultry, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c. &c. &c.

Appendix B.
No. 9.

Exports and Imports, 1835.

30.—NEWPORT CREEK.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
Exported.		Number.	Tons.	Cwt.	£	s.	d.
Corn . . .	cwts.	8,539	426	19	2,269	0	0

31.—NEWRY.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
Exported.		Number.	Tons.	Cwt.	£	s.	d.
Corn, Meal, and Flour .	cwts.	497,347	24,867	7	204,837	0	0
Provisions . .	cwts.	21,233	1,061	13	84,620	0	0
Potatoes . . .	cwts.	5,340	267	0	333	0	0
Flax and Tow . .	cwts.	25,940	1,297	0	77,820	0	0
Feathers . . .	cwts.	34	1	14	340	0	0
Tobacco . . .	lbs.	8,735	3	18	1,528	0	0
Spirits . . .	gallons	5,300	23	4	595	0	0
Linen . . .	yards	3,686,250	614	7	184,311	0	0
Eggs . . .	number	2,238,000	79	18	4,662	0	0
Cows and Oxen, . .	head	3,551	1,183	13	17,755	0	0
Horses . . .	head	898	449	0	8,980	0	0
Sheep . . .	head	30	1	0	30	0	0
Swine . . .	head	15,525	1,035	0	15,525	0	0
*Other Articles . .	value	. .	.	.	15,500	0	0
Total . .		. .	.	.	616,836	0	0
Imported.							
Coals, Culm, and Cinders .	tons	26,627	26,627	0	19,969	0	0
Iron, unwrought . .	tons	2,200	2,200	0	22,400	0	0
Cast Iron . . .	tons	500	500	0	5,000	0	0
Iron . . .	tons	200	200	0	3,000	0	0
Lead, unwrought . .	tons	160	160	0	3,600	0	0
Stones, Slates . .	tons	2,516	2,516	0	3,172	0	0
Bark, Oak for Tanners :	tons	1,168	1,168	0	5,940	0	0
Wood, Mahogany . .	tons	35½	35	10	270	0	0
Corn, Meal, and Flour .	cwts.	7,024	351	4	2,298	0	0
Sugar . . .	cwts.	13,306	665	6	39,968	0	0
Sugar, British refined .	cwts.	2,900	145	0	11,600	0	0
Hops . . .	cwts.	520	26	0	5,200	0	0
Tallow . . .	cwts.	4,616	230	16	17,064	0	0
Hides . . .	cwts.	500	25	0	1,825	0	0
Ashes . . .	cwts.	641	32	1	1,282	0	0
Tin . . .	cwts.	50	2	10	250	0	0
Cotton Yarn . .	lbs.	78,000	34	16	3,900	0	0
Linen Yarn . . .	lbs.	700,000	312	10	17,500	0	0
Woollen Yarn . .	lbs.	1.000	0	9	200	0	0
Wool, Cotton . .	lbs.	92,064	41	2	2,685	0	0
Tea . . .	lbs.	131,364	58	12	29,556	0	0
Coffee . . .	lbs.	9,787	4	7	487	0	0
Pepper . . .	lbs.	5,232	2	6	269	0	0
Tobacco . . .	lbs.	139,274	62	3	26,113	0	0
Indigo . . .	lbs.	4,000	1	15	1,400	0	0
Fish, Herrings . .	barrels	3,200	533	6	3,200	0	0
Salt . . .	bushels	86,400	2,160	0	4,320	0	0
Seeds, Flax . .	bushels	13,419	287	11	10,564	0	0
Wines . . .	gallons	13,854	61	17	8,312	0	0
Spirits, British . .	gallons	12,800	57	2	4,400	0	0
Spirits, Rum . .	gallons	1,037	5	1	725	0	0
Tinned Plates . .	boxes	1,000	166	13	1,400	0	0
Cotton Manufactures .	packages	60	10	0	1,800	0	0
Woollen Manufactures .	packages	1,100	183	6	55,000	0	0
Haberdashery and Apparel .	packages	60	10	0	2,400	0	0
Wrought Iron and Hardwares	packages	600	100	0	11,500	0	0
Machinery and Millwork .	packages	350	58	6	15,000	0	0
Glass and Earthenware .	packages	720	120	0	2,600	0	0
Leather . . .	packages	2,735	455	16	4,942	0	0
*Other Articles . .	value	. .	.	.	217,600	0	0
Total . .		. .	.	.	568,711	0	0

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* Under these heads are returned all articles of Export and Import not enumerated above, viz.:—Starch, Rags, Soap, Poultry, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c. &c. &c.

32.—ROSS.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Corn, Meal, and Flour	cwts.	87,815	4,390	15	47,280	0	0
Provisions	cwts.	1,130	56	10	3,168	0	0
Potatoes	cwts.	3,600	180	0	240	0	0
Beer	gallons	5,236	23	7	148	0	0
Cows and Oxen	head	705	235	0	2,410	0	0
Horses	head	2	1	0	27	0	0
Sheep	head	540	16	7	640	0	0
Swine	head	533	35	11	1,066	0	0
*Other Articles	value	. .	.	.	4,095	0	0
Total		. .	.	.	59,074	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	24,550	24,550	0	18,412	0	0
Iron	tons	45	45	0	360	0	0
Sugar	cwts.	305	15	5	971	0	0
Tea	lbs.	3,804	1	14	856	0	0
Fish, Herrings	barrels	2,988	498	0	3,286	0	0
Salt	bushels	21,200	530	0	530	0	0
Wines	gallons	3,799	16	10	2,848	0	0
Spirits, Rum	gallons	183	0	16	36	0	0
Tinned Plates	boxes	14	2	6	32	0	0
Glass and Earthenware	packages	30	5	0	268	0	0
*Other Articles	value	. .	.	.	408	0	0
Total		. .	.	.	28,007	0	0

33.—STRANGFORD.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Kelp	tons	80	80	0	280	0	0
Corn, Meal, and Flour	cwts.	151,192	7,559	12	59,220	16	0
Potatoes	cwts.	199,700	9,985	0	16,641	13	4
Butter	cwts.	100	5	0	420	0	0
Wool	lbs.	1,008	0	9	37	16	0
Linen	boxes	6	1	0	120	0	0
Cows and Oxen	head	412	137	6	1,648	0	0
Horses	head	17	8	10	340	0	0
Sheep	head	30	0	18	60	0	0
*Other Articles	value	. .	.	.	865	1	0
Total		. .	.	.	79,633	6	4
IMPORTED.							
Coals, Culm, and Cinders	tons	13,133	13,133	0	9,849	15	0
Iron, unwrought	tons	165	165	0	1,815	0	0
Lead, unwrought	tons	4	4	0	120	0	0
Bark, Oak for Tanners	tons	181	181	0	1,660	0	0
Wood, Mahogany	tons	7	7	0	80	0	0
Corn, Meal, and Flour	cwts.	4,706	235	6	2,446	0	0
Corn, Malt, &c.	cwts.	350	17	10	161	5	0
Fish, Herrings	barrels	720	120	0	720	0	0
Seed, Flax	bushels	140	3	0	80	0	0
*Other Articles	value	. .	.	.	3,566	8	0
Total		. .	.	.	20,498	8	0

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* These items comprise all articles Exported and Imported not detailed in the Returns.

Appendix B.
No. 9.
Exports and Imports,
1835.

34.—SLIGO.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwts.	£	s.	d.
Exported.							
Corn, Meal, and Flour	cwts.	504,803	25,240	3	185,414	0	0
Provisions	cwts.	55,389	2,769	9	181,836	0	0
Potatoes	cwts.	118	5	18	12	0	0
Sugar	cwts.	4	0	4	6	0	0
Flax and Tow	cwts.	50	2	10	140	0	0
Linen Yarn	cwts.	248	12	8	1,736	0	0
Wine	gallons	70	0	6	17	0	0
Rum	gallons	132	0	11	17	0	0
Linen	yards	6,240	1	0	312	0	0
Total,		. .	. .		369,490	0	0
Imported.							
Coals, Culm, and Cinders	tons	6,184	6,184	0	5,000	0	0
Iron, unwrought	tons	937½	937	5	7,203	0	0
Cast Iron	tons	137	137	0	1,617	0	0
Iron	tons	48	48	0	1,000	0	0
Stones, Slate	tons	860	860	0	2,580	0	0
Corn, Meal, and Flour	cwts.	7,000	350	0	3,700	0	0
Hops	cwts.	141	7	1	1,415	0	0
Sugar, British refined	cwts.	1,433	71	13	11,472	0	0
Sugar	cwts.	6,706	335	6	18,800	0	0
Tallow	cwts.	1,608	80	8	2,412	0	0
Barilla	cwts.	1,120	56	0	1,008	0	0
Ashes	cwts.	48	2	8	78	0	0
Tea	lbs.	20,186	9	0	4,037	0	0
Coffee	lbs.	4,324	1	18	125	0	0
Pepper	lbs.	1,139	0	10	170	0	0
Tobacco	lbs.	101,066	45	2	16,450	0	0
Woollen Yarn	lbs.	1,440	0	12	158	0	0
Fish, Herrings	barrels	1,334	222	6	1,500	0	0
Salt	bushels	90,640	2,266	0	6,798	0	0
Seeds, Flax	bushels	10,850	232	10	8,000	0	0
Wines	gallons	16,781	74	18	8,430	0	0
Spirits, British	gallons	33,000	147	6	11,000	0	0
Spirits, Rum	gallons	268	1	3	200	0	0
Linens	yards	2,103	0	7	80	0	0
Tinned Plates	boxes	350	58	6	705	0	0
Glass and Earthenware	packages	480	80	0	3,400	0	0
Woollen Manufactures	packages	2	0	6	103	0	0
*Other articles	value	. .	. .		7,251	0	0
Total,		. .	. .		124,692	0	0

35.—TRALEE.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
Exported.							
Kelp	tons	4	4	0	6	0	0
Corn	cwts.	164,924	8,246	4	40,072	0	0
Bacon, Hams, and Butter	cwts.	280	14	0	852	0	0
Spirits	gallons	4,377	19	10	1,385	0	0
Total,		. .	. .		42,315	0	0
Imported.							
Coals, Culm, and Cinders	tons	1,675	1,675	0	1,675	0	0
Iron, unwrought	tons	121	121	0	1,029	0	0
†Cast Iron,	tons	52	52	0	520	0	0
Lead, unwrought	tons	5	5	0	175	0	0
Corn	cwts.	1,560	78	0	416	0	0
Potatoes	cwts.	72	3	12	7	0	0
Fish, Herrings	barrels	825	137	10	1,031	0	0
Salt,	bushels	20,280	507	0	1,521	0	0
†Wrought Iron and Hardwares	packages	42	7	0	126	0	0
†Glass and Earthenware	packages	154	25	13	770	0	0
Total,		. .	. .		7,270	0	0

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* These items comprise all articles Exported and Imported not detailed in the Return.

† The estimated value of these articles was not given by the Custom-house Officers. The values assigned to them, calculated on the average values of the same articles at other Ports, have been assumed, in order to make the Return as complete as possible.

36.—WATERFORD.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwt.	£	s.	d.
EXPORTED.							
Corn, Meal, and Flour	cwts.	1,503,854	75,192	14	776,627	0	0
Provisions	cwts.	202,048	10,102	8	712,617	0	0
Potatoes	cwts.	20,000	1,000	0	2,000	0	0
Sugar	cwts.	165	8	5	494	0	0
Copper Ore	cwts.	48,000	2,400	0	21,200	0	0
Feathers	cwts.	1,040	52	0	6,240	0	0
Wine	gallons	5,402	24	2	2,701	0	0
Beer	gallons	170,000	758	18	16,999	0	0
Cotton Manufactures	yards	180,200	30	0	4,505	0	0
Calf Skins, untanned	number	6,400	160	0	320	0	0
Cows and Oxen	head	4,410	1,470	0	52,910	0	0
Horses	head	342	171	0	5,472	0	0
Sheep	head	3,996	121	1	8,991	0	0
Swine	head	74,097	4,939	16	132,469	0	0
*Other Articles	value	. .	.		77,700	0	0
Total,		. .	.	.	1,821,245	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	64,630	64,630	0	64,630	0	0
Iron, unwrought	tons	470	470	0	4,700	0	0
Cast Iron	tons	125	125	0	850	0	0
Lead	tons	160	160	0	3,200	0	0
Stones, Slate	tons	500	500	0	2,000	0	0
Bark, Oak for Tanners	tons	85	85	0	850	0	0
Hops	cwts.	1,718	85	18	9,400	0	0
Sugar, British refined	cwts.	8,400	420	0	42,000	0	0
Sugar, foreign	cwts.	22,973	1,148	13	76,071	0	0
Tallow	cwts.	10,650	532	10	33,000	0	0
Hides	cwts.	13,112	655	12	26,110	0	0
Brass and Copper	cwts.	50	2	10	50	0	0
Tin	cwts.	825	41	5	825	0	0
Tea	lbs.	141,840	63	6	35,466	0	0
Coffee	lbs.	3,600	1	12	130	0	0
Pepper	lbs.	13,220	5	18	661	0	0
Tobacco	lbs.	366,000	163	7	102,900	0	0
Wool	lbs.	179,628	80	3	266,980	0	0
Woollen Yarn	lbs.	2,850	1	5	142	0	0
Linen Yarn	lbs.	1,000	0	9	50	0	0
Cotton Yarn	lbs.	54,464	24	6	2,712	0	0
Fish, Herrings	barrels	10,000	1,666	13	14,000	0	0
Salt	bushels	25,320	633	0	1,266	0	0
Seeds, Flax	bushels	2,800	60	0	5,600	0	0
Wines	gallons	11,500	51	6	5,750	0	0
Spirits, British	gallons	51,700	230	16	25,850	0	0
Spirits, Irish	gallons	165,300	737	18	49,590	0	0
Spirits, Rum	gallons	6,000	26	15	3,000	0	0
Linens	yards	550	0	2	82	0	0
Tinned Plates	boxes	130	21	13	130	0	0
Leather	packages	211	35	6	1,055	0	0
Cotton Manufactures	packages	2,404	400	13	380,600	0	0
Woollen Manufactures	packages	444	74	0	14,820	0	0
Haberdashery and Apparel	packages	182	30	6	7,280	0	0
Wrought Iron and Hardwares	packages	7,582	1,263	13	8,582	0	0
Machinery and Mill-work	packages	110	18	6	5,500	0	0
Glass and Earthenware	packages	737	122	16	3,822	0	0
*Other Articles	value	. .	.	.	74,500	0	0
Total,		. .	.	.	1,274,154	0	0

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* Under these heads are returned all articles of Export and Import not enumerated above, viz.—Starch, Rags, Soap, Poultry, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c. &c. &c.

Appendix B.
No. 9.

Exports and Imports,
1835.

37.—WEXFORD.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
EXPORTED.		Number.	Tons.	Cwt.	£	s.	d.
Corn, Meal, and Flour	cwts.	486,485	24,324	5	175,180	0	0
Butter	cwts.	18,000	900	0	54,000	0	0
Feathers	cwts.	400	20	0	400	0	0
Wool	lbs.	50,000	22	6	3,000	0	0
Eggs	crates	20	6	0	160	0	0
Spirits	gallons	480	2	2	96	0	0
Cows and Oxen	head	3,000	1,000	0	36,000	0	0
Horses	head	20	10	0	300	0	0
Sheep	head	7,500	227	5	15,000	0	0
Swine	head	2,200	146	16	12,000	0	0
*Other Articles	value	. .	.	.	16,000	0	0
Total		. .	.	.	312,136	0	0
IMPORTS.							
Coals, Culm, and Cinders	tons	29,000	29,000	0	26,100	0	0
Iron	tons	750	750	0	4,400	0	0
Cast Iron	tons	180	180	0	19,800	0	0
Iron, foreign	tons	500	500	0	3,500	0	0
Lead	tons	280	280	0	840	0	0
Stones, Slate	tons	750	750	0	1,080	0	0
Bark, Oak for Tanners	tons	250	250	0	2,250	0	0
Wood, Mahogany	tons	55	55	0	660	0	0
Hops	cwts.	54	2	14	270	0	0
Sugar, British refined	cwts.	1,050	52	10	6,300	0	0
Sugar	cwts.	9,845	492	5	29,535	0	0
Tallow	cwts.	812	40	12	1,580	0	0
Hides	cwts.	650	32	10	1,700	0	0
Brass and Copper	cwts.	40	2	0	120	0	0
Ashes	cwts.	35	1	15	75	0	0
Cotton Yarn	lbs.	450	0	4	50	0	0
Wool, Cotton	lbs.	50,500	22	10	1,267	0	0
Tea	lbs.	80,000	35	14	16,000	0	0
Coffee	lbs.	2,500	1	2	250	0	0
Pepper and Spices	lbs.	1,245	0	11	195	0	0
Tobacco	lbs.	2,200	0	19	330	0	0
Fish, Herrings	barrels	600	100	0	900	0	0
Salt	bushels	650	16	5	600	0	0
Seeds, Flax	bushels	140	3	0	420	0	0
Spirits, Rum	gallons	900	4	0	725	0	0
Wines	gallons	13,500	60	8	6,750	0	0
Spirits	gallons	61,600	275	0	15,400	0	0
Linens	yards	30,000	5	0	1,120	0	0
Tinned Plates	boxes	280	46	13	700	0	0
Cotton Manufactures	packages	350	58	6	4,500	0	0
Woollen Manufactures	packages	600	100	0	120,000	0	0
Haberdashery and Apparel	packages	700	116	13	16,000	0	0
Leather	packages	240	40	0	3,000	0	0
Wrought Iron and Hardwares	packages	4,000	666	13	19,000	0	0
Glass and Earthenware	packages	1,500	250	0	9,000	0	0
*Other Articles	value	. .	.	.	307,000	0	0
Total		. .	.	.	621,417	0	0

* Under these heads are returned all articles of Export and Import not enumerated above, viz. :—Starch, Rags, Soap, Poultry, Apples, Scrap Iron, Bones, Paper, Sacks, Clover, Paints, Jars, Bottles, Resin, Blocks, Timber, &c. &c. &c.

Appendix B.
No. 9.

Exports and Imports,
1835.

38.—WESTPORT.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwts.	£	s.	d.
EXPORTED.							
Corn, Meal, and Flour	cwts.	292,485	14,624	5	83,547	0	0
Provisions	cwts.	1,061	53	1	890	0	0
Spirits	gallons	5,561	24	16	1,668	0	0
Wool	bales	11	3	6	140	0	0
Linen	bales	7	3	10	560	0	0
Flax and Tow	bales	77	3	17	1,000	0	0
Total,		. .	. .		87,805	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	2,533	2,533	0	1,360	0	0
Iron	tons	250	250	0	5,000	0	0
Cast Iron	tons	30	30	0	750	0	0
Lead	tons	20	20	0	400	0	0
Stones, Slate	tons	166	166	0	400	0	0
Salt	tons	1,400	1,400	0	1,750	0	0
Corn, Meal, and Flour	cwts.	2,878	143	18	1,135	0	0
Corn, Malt	cwts.	400	20	0	200	0	0
Potatoes	cwts.	3,200	160	0	320	0	0
Ashes	cwts.	165	8	5	800	0	0
Barilla	cwts.	284	14	4	300	0	0
Sugar	tierce	128	51	4	2,700	0	0
Seeds, Flax	tierce	1,759	703	12	5,277	0	0
Tallow	casks	138	69	0	2,760	0	0
Fish, Herrings	barrels	509	84	16	525	0	0
Coffee	barrels	6	0	15	100	0	0
Tea	chests	15	0	10	240	0	0
Spirits, Rum	cask	1	0	2	50	0	0
Spirits	gallons	11,172	49	17	3,350	0	0
Glass and Earthenware	packages	260	43	6	1,000	0	0
Hides	number	181	4	10	100	0	0
Total,		. .	. .		28,517	0	0

39.—WICKLOW.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwts.	£	s.	d.
EXPORTED.							
Copper Ore	tons	12,614	12,614	0	63,075	0	0
Corn	cwts	74,641	3,732	1	23,490	18	0
Total,		. .	. .		86,565	18	0
IMPORTED.							
Coals, Culm, and Cinders	tons	7,296	7,296	0	6,202	0	0
Salt	tons	354	354	0	442	0	0
Iron, British	tons	178	178	0	3,184	0	0
Iron, Foreign	tons	42	42	0	924	0	0
Wood	tons	605	605	0	2,711	10	0
Potatoes	tons	16	16	0	64	0	0
Meal and Flour	cwts.	1,140	57	0	835	10	0
Sugar	hhds.	12	9	0	528	0	0
Tea	chests	42	1	10	420	0	0
Wines	casks	15	9	0	300	0	0
Glass and Earthenware	packages	8	1	6	60	0	0
Total		. .	. .		15,671	0	0

Appendix B.
No. 9.

Exports and Imports,
1835.

40.—YOUGHAL.

ARTICLES.		QUANTITY.			ESTIMATED VALUE.		
		Number.	Tons.	Cwts.	£	s.	d.
EXPORTED.							
Provisions	cwts.	10,328	516	8	35,835	0	0
Grain and Meal	cwts.	444,284	22,214	4	161,775	0	0
Spirits	gallons	613	2	13	184	0	0
Cows and Oxen	head	100	33	6	800	0	0
Sheep	head	434	13	2	650	0	0
Swine	head	6,429	428	12	16,072	0	0
Total,		. .	. .		215,316	0	0
IMPORTED.							
Coals, Culm, and Cinders	tons	37,992	37,992	0	24,367	0	0
Stones, Slate	tons	334	334	0	302	0	0
Sugar, British refined	cwts.	72	3	12	216	0	0
Tallow,	cwts.	104	5	4	260	0	0
Fish, Herrings	barrels	150	25	0	165	0	0
Salt,	bushels	12,000	300	0	1,200	0	0
Beer and Ale	tierces	835	156	11	1,800	0	0
Total,		. .	. .		28,310	0	0

SUMMARY.

NAMES OF PORTS.	EXPORTS. 1835.			IMPORTS. 1835.		
	Value.			Value.		
	£	s.	d.	£	s.	d.
Ardglass and Killough	35,161	0	0	2,970	0	0
Arklow	3,677	0	0	6.762	10	0
Balbriggan	5,417	10	0	11,391	19	2
Ballina	70,568	0	0	13,532	0	0
Ballyrane Creek	20,834	0	0	5,770	0	0
Ballycastle Creek	1,791	0	0	2,030	13	3
Ballyshannon	11,130	0	0	9.524	0	0
Baltimore, &c.	37,144	0	0	17,767	0	0
Bantry Creek	6,212	0	0	17,293	8	0
Berehaven Creek	77,360	0	0	30,081	0	0
Belmullet Creek	2,940	0	0	—		
Belfast	4,341,794	3	7	3,695,437	11	10
Clare Creek	16,617	0	0	1,672	0	0
Coleraine & Portrush	105,685	0	0	65,900	0	0
Cork	2,909,846	0	0	2,751,684	0	0
Donaghadee Creek	62,484	0	0	7,570	0	0
Donegal Creek	11,363	0	0	11,331	0	0
Drogheda	766,027	0	0	259,854	0	0
Dublin	2,528,543	0	0	4,430,321	0	0
Dundalk	452,813	0	0	107,953	0	0
Dungarvan	69,486	0	0	16,312	15	0
Galway	251,864	0	0	88,268	12	8
Killala	26,396	0	0	3,188	0	0
Kilrush	36,158	0	0	2,768	0	0
Kinsale Creek	13,479	0	0	18,262	0	0
Larne Creek	66,309	0	0	7,255	6	7
Limerick	726,430	0	0	323,740	0	0
Londonderry	1,040,918	0	0	708,054	0	0
Newcastle Creek	3,681	10	0	3,156	0	0
Newport Creek	2,269	0	0	—		
Newry	616,836	0	0	568,711	0	0
Ross	59,074	0	0	28,007	0	0
Strangford	79,633	6	4	20,498	8	0
Sligo	369,490	0	0	124,692	0	0
Tralee	42,315	0	0	7,270	0	0
Waterford	1,821,245	0	0	1,274,154	0	0
Wexford	312,136	0	0	621,417	0	0
Westport	87,805	0	0	28,517	0	0
Wicklow	86,565	18	0	15,671	0	0
Youghal	215,316	0	0	28,310	0	0
Total	17,394,813	7	11	15,337,097	4	6

Appendix B. No. 10.

Table of Exports.

APPENDIX B. No. 10.

RETURN SHOWING THE QUANTITY, ESTIMATED TONNAGE, AND ESTIMATED VALUE OF THE EXPORTS OF IRELAND, *exclusive of Coasting Trade*, IN THE YEARS 1825 AND 1835; AND ALSO THE INCREASE BETWEEN THESE PERIODS.

COMMODITIES.		Quantity.		Increase between these Periods.	Estimated Tonnage.				Increase of Tonnage between these Periods.		Estimated Value.						Increase of Aggregate Value between the Years 1825 and 1835.		
		1825	1835.		1825.		1835.				1825.*			1835.					
					Tons.	Cwts.	Tons.	Cwts.	Tons.	Cwts.	£	s.	d.	£	s.	d.	£	s.	d.
Cows and Oxen,	number	63,524	98,150	34,626	21,174	13	32,716	15	11,542	0				793,837	0	0	7,450,475	6	1
Horses,	ditto	3,140	4,655	1,515	1,570	0	2,327	10	806	0				65,453	0	0			
Sheep,	ditto	72,191	125,452	53,261	2,187	12	3,801	11	1,613	19				199,986	0	0			
Swine,	ditto	65,919	376,191	310,272	4,394	12	25,079	8	20,684	16				893,839	0	0			
Grain, viz., Wheat,	quarters	283,340	420,522	137,182	70,835	0	105,130	10	34,295	10				812,441	0	0			
Barley,	ditto	154,822	168,946	14,124	30,964	8	33,789	4	2,824	16				210,756	0	0			
Oats,	ditto	1,503,204	1,575,984	72,780	250,534	0	262,664	0	12,130	0				1,661,953	3	0			
Other Grain,	ditto	23,832	39,637	15,805	5,958	0	9,909	5	3,951	5				75,149	6	0			
Wheatmeal, Flour, and Oatmeal,	cwts.	599,124	1,984,480	1,390,356	29,956	4	99,224	0	69,267	16				1,441,966	0	0			
Potatoes,	ditto	—	223,398	—	—		11,169	18	—					17,537	0	0			
Provisions, Bacon, and Hams,	ditto	362,278	379,111	16,833	18,113	18	18,955	11	841	13				828,158	0	0			
" Beef and Pork,	ditto (a)	604,253	370,172	—	30,212	13	18,508	12	—					723,935	0	0			
" Butter,	ditto	474,161	827,009	352,848	23,708	1	41,350	9	17,642	8				3,316,306	0	0			
" Lard,	ditto	35,261	70,267	35,006	1,763	1	3,513	7	1,750	6				182,013	0	0			
Soap and Candies,	ditto	42	—	—	2	2	—		—					--					
Eggs,	number	—	52,244,890	—	—		1,865	17	—					87,352	0	0			
	crates	—	2,275	—	—		682	10	—					87,660	0	0			
	boxes	—	10,695	—	—		1,069	10	—					31,027	0	0			
Feathers,	cwts.	—	6,432	—	—		321	12	—					32,636	0	0			
Hides and Calf Skins,	number	—	57,657	—	—		1,441	7	—					45,831	0	0			
Wool, Sheep and Lambs',	bales	—	33	—	—		9	18	—					1,240	0	0			
	lbs.	—	764,184	—	—		341	3	—					17,322	16	0			
Flax and Tow,	cwts.	54,898	163,949	109,051	2,744	18	8,197	9	5,452	11				402,773	10	0			
Lead and Copper Ore,	ditto	—	477,660	—	—		23,883	0	—					179,388	0	0			
Spirits,	gallons (b)	629,529	459,473	—	2,810	7	2,051	4	—					75,505	0	0			
Beer,	ditto	—	2,686,688	—	—		11,994	2	-					138,981	0	0			
Cotton Manufactures,	yards (c)	10,567,458	1,039,088	—	1,761	4	173	0	—					15,253	0	0			
	packages	—	6,583	—	—		1,097	3	—					131,660	0	0			
Cotton Yarn	lbs.	—	13,428	—	—		6	0	—					1,220	0	0			
Linen,	yards	55,114,515	70,209,572	15,095,057	9,185	15	11,701	12	2,541	13				3,725,054	0	0			
	boxes	—	134	—	—		22	6						5,240	0	0			
	bales	—	7	—	—		3	10						560	0	0			
Silk Manufactures,	yards	—	8,400	—	—		1	8	—					21,740	0	0			
Woollen Manufactures,	ditto	—	100,320	—	--		16	14	—					40,128	0	0			
Other Articles,	value	—	—	—	—		—		—		466,300	0	0	369,294	0	0			
FOREIGN AND COLONIAL MERCHANDIZE—																			
Tea,	lbs	—	37,550	—	—		16	15	—					8,316	0	0			
Coffee,	ditto	14,814	47,642	32,828	6	12	21	5	14	13				2,971	9	6			
Sugar,	cwts. (d)	28,252	2,922	—	1,412	12	146	2	—					9,245	12	6			
Molasses,	ditto	—	7,597	—	—		397	17	—					21,639	4	6			
Tobacco,	lbs. (e)	1,118,926	52,751	—	499	10	23	11	-					6,814	8	6			
Wine,	gallons	64,995	78,063	13,068	290	3	348	9	58	6				37,892	6	0			
Rum,	ditto (f)	35,807	2,195	—	159	17	9	16	—					1,327	19	0			
Hemp,	cwts.	—	1,720	—	—		86	0	—					2,508	0	0			
Other Articles,	value	—	—	—	—		—		—		32,449	0	0	19,775	11	1			
Total Tonnage, and Aggregate Official Value of Exports in 1825 and 1835,					510,245	2	734,068	18	223,823	16	9,243,210	0	0	16,693,685	6	1	7,450,475	6	1

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* The Collector of Customs, Dublin, states that there are not any documents in his office from which a detailed Account of the Value of the Exports in 1825 could be obtained; and it is supposed that this remark will apply to all the Ports of Ireland. The Aggregate Value is taken from Porter's Tables.

(a) Decrease, 234,081 cwts = 11,704 tons 1 cwt.

(b) Decrease, 170,056 gallons = 759 tons.

(c) Decrease, 490 tons 17 cwt.

(d) Decrease, 25,330 cwts. = 1,266 tons 10 cwt.

(e) Decrease, 1,066,175 lbs. = 475 tons 19 cwt.

(f) Decrease, 33,612 gallons = 150 tons.

Appendix B.
No. 10.
Table of Imports.

RETURN SHOWING THE QUANTITY, ESTIMATED TONNAGE, AND ESTIMATED VALUE OF THE IMPORTS OF IRELAND, *exclusive of Coasting Trade*, IN THE YEARS 1825 AND 1835; AND ALSO THE INCREASE BETWEEN THESE PERIODS.

COMMODITIES.		Quantity.		Increase between these periods.	Estimated Tonnage.				Increase of Tonnage between these periods.		Estimated Value.						Increase of Aggregate Value, between the Years 1825 and 1835.		
		1825.*	1835.		1825.		1835.				1825.			1835.					
					Tons.	Cwt.	Tons.	Cwt.	Tons.	Cwt.	£	s.	d.	£	s.	d.	£	s.	d.
Coals, Culm, and Cinders,	tons	738,453	1,001,378	262,925	738,453	0	1,001,378	0	262,925	0				802,749	5	2	2,321,674	4	4
Corn, Malt,	quarters	—	4,300	—	—		860	0	—					11,388	0	0			
Other sorts,	ditto	—	5,861	—	—		1,465	5	—					11,192	5	0			
Hops,	cwts.	—	13,944	—	—		697	4	—					92,657	0	0			
Bark, Oak for Tanners,	tons	—	6,866	—	—		6,866	0	—					57,613	0	0			
Beer and Ale,	tuns	—	333	—	—		333	0	—					2,586	0	0			
Fish, Herrings,	barrels	—	111,508	—	—		18,584	13	—					124,084	0	0			
Salt,	bushels	—	1,646,614	—	—		41,165	7	—					65,718	14	0			
Sugar, British refined,	cwt (a)	66,392	43,987	—	3,319	12	2,199	7	—					199,725	8	0			
Spirits, British and Irish,	gallons (b)	—	388,620	—	—		1,734	18	—					101,070	0	0			
Spirits, foreign, Rum,	ditto	33,295	37,349	4,054	148	12	166	14	18	2				18,419	0	6			
Metals Unwrought Brass and Copper,	cwt.	—	4,650	—	—		232	10	—					23,930	0	0			
Iron,	tons	17,902	19,330	1,428	17,902	0	19,330	0	1,428	0				175,557	0	0			
Lead,	ditto	—	1.488	—	—		1,488	0	—					29,341	0	0			
Tin,	cwts.	—	1,235	—	—		61	15	—					2,742	0	0			
Cast Iron,	tons	—	7,093	—	—		7,093	0	—					89,130	0	0			
Iron, foreign,	ditto	—	2,820	—	—		2,820	0	—					33,273	0	0			
Stones, Slate,	ditto	—	18.894	—	—		18,894	0	—					50,685	6	7			
Wool, Sheep, or Lambs,	lbs.	—	811,500	—	—		362	5	—					304,337	0	0			
Woollen Yarn,	ditto (c)	579,051	65,118	—	258	10	29	1	—					15,297	0	0			
Linen Yarn,	ditto	—	2,632,000	—	—		1,183	18	—					1,217,900	0	0			
Cotton Yarn,	ditto (d)	2,702,523	582,914	—	1,206	9	260	4	—					40,412	0	0			
Cotton Manufactures,	yards	4,996,885	14,172,000	9,175,115	832	16	2,362	3	1,529	7				1,419,364	0	0			
Woollen Manufactures,	ditto	3,384,918	7,884,000	4,499,082	564	3	1,314	6	750	3				685,423	0	0			
Wool, Cotton, foreign,	lbs.	4,065,930	2,646,356	—	1,815	3	1,181	8	—					146,354	0	0			
Wool, Sheep, foreign,	ditto	—	155,008	—	—		69	4	—					11,625	0	0			
Linens, Irish,	yards	—	30,500	—	—		5	1	—					1,170	0	0			
Linens, British,	ditto	—	322,653	—	—		53	15	—					12,662	0	0			
Silks, Raw and Thrown, foreign,	lbs. (e)	62,128	9,072	—	27	14	4	1	—					5,292	0	0			
Tinned Plates,	boxes	—	9,020	—	—		1,503	6	—					2,035	0	0			
Leather,	packages	—	2,196	—	—		366	0	—					30,840	0	0			
Wrought Iron and Hardwares,	ditto (f)	—	18,326	—	—		3,054	6	—		264,944	0	0	119,596	0	0			
Machinery and Millwork,		—	2,361	—	—		393	10	—					79,210	0	0			
Glass and Earthenware,	ditto	—	14,108	—	—		2,351	6	—					128,709	0	0			
Haberdashery and Apparel,	ditto	—	6,177	—	—		1,029	10	—		337,208	0	0	487,630	0	0			
Ashes,	cwts.	112,836	12,482	—	5,641	16	624	2	—					22,217	0	0			
Barilla,	ditto		3,445				172	5	—					2,199	0	0			
Indigo,	lbs.	—	99,183	—	—		44	5	—					22,200	0	0			
Hides,	cwts.	—	74,897	—	—		3,744	17	—					163,221	0	0			
Tallow,	ditto (g)	186,147	87,867	—	9,307	7	4,393	7	—					129,149	0	0			
Sugar, foreign,	ditto (h)	280,634	189,080	—	14,031	14	9,454	0	—					575,205	14	3			
Tea,	lbs.	3,889,658	4,794,316	904,658	1,736	9	2,140	6	403	17				972,554	11	8			
Coffee,	lbs.	335,921	1,205,762	869,841	149	19	538	5	388	6				64,455	8	4			
Tobacco,	lbs.	3,904,034	4,467,746	563,712	1,742	17	1,994	10	251	13				743,115	7	10			
Wines,	gallons (i)	968,940	304,031	—	4,325	14	1,357	17	—					160,313	1	3			
Flax Seed,	bushels	533,331	246,458	288,873	11,471	7	5,281	5	6,190	2				84,329	0	0			
Other Articles,	value	—	—	—	—		—		—		2,021,973	0	0	1,379,783	1	9			
Aggregate official value of Imports, in 1825 and 1835,		-	-	-	-		-		-		8,596,785	0	0	10,918,459	4	4	2,321,674	4	4

* It is supposed that many of the Articles which appear blank in the columns for 1825, and detailed in those for 1835, are returned in the Aggregate Value of "Other Articles."

(a) Decrease, 22,405 cwt. = 1,120 tons 5 cwt.
(d) Decrease, 2,119,609 lbs = 946 tons 5 cwt.
(g) Decrease, 98,280 cwt = 4,914 tons.

(b) Quantity of Irish Spirits. 1,200 gallons; value, £450.
(e) Decrease, 53,056 lbs. = 23 tons 13 cwt.
(h) Decrease, 91,554 cwt = 4,577 tons 14 cwt.

(c) Decrease, 513,933 lbs. = 229 tons 9 cwt.
(f) Decrease, £66,138.
(i) Decrease, 664,909 gallons = 2,967 tuns 17 cwt

Appendix B. No. 11.
Table of Tonnage.

APPENDIX B. No. 11.

RETURN showing the AMOUNT or TONNAGE ENTERED AT and CLEARED OUT from the several PORTS and SUB-PORTS in IRELAND, in the Years ending 5th January, 1825, 1836, and 1837; distinguishing, as far as practicable, the QUANTITY IN BALLAST.

PORTS AND SUB-PORTS	1824.						1835.						1836.					
	ENTERED.			CLEARED.			ENTERED.			CLEARED.			ENTERED.			CLEARED.		
	With Cargo.	In Ballast.	Total.	With Cargo.	In Ballast.	Total.	With Cargo.	In Ballast.	Total.	With Cargo.	In Ballast.	Total.	With Cargo.	In Ballast.	Total.	With Cargo.	In Ballast.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Ton .	Tons.	Tons.	Tons.	Tons.
BALTIMORE, embracing Castletownsend, Glendore, and Ross, Bantry Creek, Berehaven, (a)	5,524	–	5,524	5,257	–	5,257	11,068	–	11,068	24,952	–	24,952	7,603	–	7,603	15,718	–	15,718
BELFAST,	185,324	55	185,379	98,684	7,221	105,905	301,849	20	301,869	178,449	12,750	191,199	314,891	21	314,912	188,332	11,322	199,654
Larne Creek,	7,359	–	7,359	9,123	–	9,123	15,851	–	15,851	9,078	–	9,078	12,465	–	12,465	13,795	–	13,795
Donaghadee Creek,	1,937	–	1,937	6,736	–	6,736	5,432	–	5,432	19,128	–	19,128	3,969	–	3,969	13,824	–	13,824
COLERAINE & PORTRUSH (b)	–	–	–	–	–	–	14,660	–	14,660	9,549	1,355	10,904	19,046	–	19,046	11,915	1,006	12,921
Ballycastle Creek,	–	–	–	–	–	–	927	–	927	500	–	500	815	–	815	694	–	694
CORK,	147,195	19	147,214	96,652	9,634	106,286	209,038	307	209,345	155,069	10,125	165,194	207,506	550	208,056	139,965	13,796	153,761
Kinsale Creek,	8,098	–	8,098	2,269	–	2,269	13,815	–	13,815	5,409	289	5,698	12,037	–	12,037	3,974	539	4,513
Youghal,	33,592	–	33,592	32,299	281	32,580	34,991	–	34,991	27,218	917	28,135	26,601	110	26,711	25,234	917	26,151
DROGHEDA,	31,668	–	31,668	26,225	6,876	33,101	51,830	–	51,830	63,624	15,019	78,643	52,904	–	52,904	74,911	15,639	90,550
DUBLIN,	349,149	–	349,149	166,825	–	166,825	473,210	–	473,210	268,502	–	268,502	474,450	–	474,450	281,539	–	281,539
Arklow, Balbriggan, Wicklow, (c)	–	–	–	–	–	–	25,576	–	25,576	17,553	–	17,553	22,681	–	22,681	14,562	–	14,562
DUNDALK,	–	–	–	–	–	–	45,331	–	45,331	45,623	–	45,623	45,355	–	45,355	44,476	–	44,476
DUNGARVAN,	6,396	1,392	7,788	3,560	2,140	5,700	12,597	3,224	15,821	6,258	5,324	11,582	9,774	3,320	13,094	7,817	4,620	12,437
GALWAY, including Clifden Creek,	7.009	1,116	8,125	5,589	509	6,098	12,578	4,057	16,635	17,051	1,741	18,792	15,722	2,671	18,393	15,222	1,905	17,127
LIMERICK, (d)	34,049	4,599	38,648	33,213	4,580	37,793	56,367	–	56,367	49,132	5,974	55,106	51,730	577	52.307	56,312	7,265	63,577
Clare Creek,	–	–	–	–	–	–	1,796	–	1,796	2,431	–	2 431	1,445	–	1.445	3,476	–	3,476
Kilrush,	–	–	–	–	–	–	862	–	862	4,991	–	4,991	1,035	–	1,035	5,442	–	5,442
Tralee,	–	–	–	–	–	–	6,849	–	6,849	6,863	753	7,616	7,058	80	7,138	7,375	1,246	8,621
LONDONDERRY, Ballyrame Creek,	37,455	–	37,455	31,650	–	31,650	87,337	–	87,337	75,117	–	75,117	88,653	–	88,653	77,651	–	77,651
NEWRY, Ardglass and Killough, Newcastle, Strangford,	15,797	–	15,797	13,990	–	13,990	96,980	–	96,980	84,519	–	84,519	87,612	–	87,612	71,308	–	71,308
SLIGO,	14,594	991	15,585	13,985	2,311	16,296	22.266	3,506	25,772	22,178	4,569	26,747	19,580	1,106	20,686	16,391	5,398	21,789
Ballina Creek, (e)	–	–	–	–	–	–	4,371	3,424	7,795	7,288	424	7.712	3,609	2,127	5.736	5,596	381	5.977
Ballyshannon Creek, (f)	–	–	–	–	–	–	3,628	–	3,628	3,025	–	3,025	3,719	–	3,719	3,656	–	3,656
Donegal Creek, (g)	–	–	–	–	–	–	2,799	145	2,944	1,936	1,095	3,031	2,494	53	2,547	1,398	928	2,326
Killala,	1,637	3,056	3,693	3,040	–	3,040	1,113	2,438	3,551	3,083	–	3,083	1,245	2,562	3,907	3,388	–	3,388
WATERFORD, (h)	–	–	–	–	–	–	140,641	–	140,641	136,297	–	136,297	162,312	–	163,312	148,254	–	148,254
Ross,	–	–	–	–	–	–	23,213	–	23,213	14,130	–	14,130	25,523	–	25,533	12,034	–	12,034
WESTPORT,	7.227	–	7.227	7,344	–	7,344	7,483	–	7,483	11,153	–	11,153	6.522	–	6,522	10,440	–	10,440
WEXFORD,	22,976	–	22,976	27,452	–	27,452	34,317	–	34,317	31,373	–	31,373	37,686	–	37,686	35,941	–	35,941

(a) Quantity in Ballast cannot be ascertained.
(b) Return of Tonnage for 1824 cannot be obtained, nor is there any account of Vessels entering this Port in Ballast.
(c) No account is taken of Vessels sailing in Ballast; but as an arrival in Ballast is a most unusual occurrence, the Return inwards may be taken as very nearly a correct account of the whole Tonnage, and, therefore, the inward and outward Returns will very nearly show the amount of Tonnage outwards in Ballast. No separate account of Tonnage was kept for Creeks, in 1824, neither were Arklow and Wicklow at that time in connexion with the Port of Dublin.
(d) An account of Vessels either inwards or outwards coastwise, in Ballast, cannot be obtained.
(e) During the year 1824, business was transacted at Killala.
(f) No record kept for the year 1824.
(g) No record kept for the year 1824.
(h) Return of Tonnage for 1824 cannot be obtained, nor is there any account of Vessels sailing in Ballast.

APPENDIX B. No. 12.

LONDONDERRY.

STATEMENT OF THE EXPORTS AND IMPORTS IN THE YEAR 1835.

(Not Official.)

Appendix B.
No. 12.

Londonderry.
Exports and
Imports.
1835.

ARTICLES.		Per Steam Boats.	Per Sailing Vessels.	Total.
Exported.				
Flax, .	tons	1,753½	2,302½	4,056
Linen Cloth, .	boxes	1,043	28	1,071
" " .	bales	145	11	156
" " .	sq. feet ℘ boxes	8,260	—	8,260
Oatmeal, .	tons	998	1,150	2,148
Grain, .	tons	4,119	14,194	18,313
Pork, .	barrels	3,041	4.344	7,385
" .	tierces	268	1,311	1,579
Bacon, .	bales	496	363	859
Beef, .	barrels	409	429	838
" .	tierces	1,990	358	2,348
Eggs, .	boxes	8,264	—	8,264
" .	square feet	221,454	—	221,454
Butter, .	firkins	65,645	768	66,413
" .	crocks	8,787	—	8,787
" .	boxes	1,766	—	1,766
Pigs, .	head	11,103	—	11,103
Flour, .	bags	222	—	222
" .	tons	29	—	29
Tanner's Waste, .	tons	20½	10	30½
Hides and Skins, .	hogsheads	1,139	514	1,653
Bones, .	hogsheads	12	9	21
Lard, .	tierces	3	8	11
" .	firkins	288	30	318
Rags, .	bales	76	—	76
" .	tons	78	—	78
Feathers, .	sacks	3	—	3
Hair, .	crates	4	42	46
Horses, .	head	73	—	73
Black Cattle, .	head	855	—	855
Fowls, .	crates	25	—	25
Hams, .	hogsheads	223	5	228
Sheep and Lambs, .	head	313	—	313
Hair, .	tons	15½	—	15½
Herrings, .	barrels	—	714	714
Whiskey, .	puncheons	—	529	529
Deals, .	hundreds	—	114	114
Timber, .	tons	—	100	100
Sugar, .	hogsheads	—	2	2
" .	casks	—	1	1
Staves, .	thousands	—	31½	31½
Weed Ashes, .	barrels	—	37	37
Barilla, .	bales	—	3	3
Flaxseed, .	hogsheads	—	1,088	1,088
" .	barrels	—	180	180
" .	bags	—	121	121
Salt, .	tons	—	693	693
Coal, .	tons	—	100	100
Pig Iron, .	tons	—	170	170
Iron, .	barrels	—	60	60
Cotton .	yards	—	968	968
" .	bales	—	1	1
Earthenware, .	pieces	—	50	50
Hats, .	number	—	698	698
" .	boxes	—	2	2
" .	hogsheads	—	1	1
Stockings, .	dozens	—	361	361
Shoes, .	pairs	—	150	150
Potatoes, .	hampers	—	5,853	5,853
Woollen Goods, .	bales	—	30	30
Tallow, .	casks	—	2	2
Tar, .	barrels	—	8	8
Boxes and Barrels,	number	—	179	179
Oysters, .	hogsheads	—	1,050	1,050
" .	tierces	—	350	350
Salmon, (Foyle fishery)	boxes	—	2,046	2,046
" (Ballyshannon do.)	boxes	—	1,950	1,950
Imported.				
Whiskey, .	puncheons	1,031	60	1,091
Sugar, .	hhds.	1,598	429	2,027
Candy, .	boxes	609	—	609
Tea, .	chests and boxes	1,248	953	2,201
Ale, .	casks	706	—	706
Oil, .	casks	160	154	314
Molasses, .	puncheons	79	71	150
Lemons and Oranges,	boxes	176	510	686
Barley, .	bags	292	30	322
Castings, .	tons	193½	220	413½
Copperas, .	tierces	34	—	34
Rum, .	hhds.& punchns.	24	15	39
Vitriol, .	carboys	210	—	210
Imported—*continued.*				
Iron, Pig, .	tons	295	100	395
Iron, .	tons	48	782	830
Flaxseed, .	barrels & hhds.	2,842	24,424	27,266
" .	bags	110	—	110
Seeds, .	bags	163	23	186
Cheese, .	tons	3	—	3
Hemp, .	tons	60	40	100
Biscuit, .	tons	3½	—	3½
Tar, .	barrels	146	283	429
Earthenware, .	hhds.	198	—	198
" .	crates	250	—	250
Glass, .	crates	28	648	676
Alum, .	tierces	26	—	26
Soft Goods, .	bales and trusses	1,304	64	1,368
Merchandize, .	casks and bmprs	792	150	942
" .	jars and chests	171	20	191
" .	boxes	1,129	101	1,230
" .	hhds.	23	20	43
" .	parcels	727	100	827
Mats, .	number	233	200	433
Old Clothes, .	bales	271	—	271
Earthenware, .	loads	42	—	42
Pepper, .	bags	292	66	358
Machinery, .	tons	80	6	86
Sundries, .	bags	281	50	331
Planes, .	number	12	—	12
Cork wood, .	bundles	50	tons 2	—
Bran, .	tons	8	30	38
Cordage, .	bales and coils	165	—	165
Mahogany, .	logs	88	16	104
Waste, .	bags	60	—	60
Twine, .	mats	20	—	20
Wicks, .	bags	44	—	44
Wine, .	hhds. and pipes	107	292	399
" Bottled, .	boxes	36	20	56
Potatoes, .	bags	76	—	76
Tobacco, .	hhds.	230	9	239
Sheep and Lambs,	head	742	—	742
Bass Matts, .	number	850	1815	2,665
Coal Dust, .	hhds.	6	—	6
Leather, .	bales	25	—	25
Coke, .	tons	2	—	2
Packages, .	number	443	134	577
Indigo, .	chests	—	12	12
Ginger, .	barrels	—	67	67
Raisins and Figs,	boxes	cwt 46	600	—
Almonds, .	boxes	—	28	28
Clover Seed, .	cwts	—	151	151
Brimstone, .	cwts.	—	771	771
Fire Bricks, .	number	—	10,425	10,425
Tiles, .	number	—	4,750	4,750
Shumack, .	bags and casks	—	416	416
Pot Ash, .		—	30	30
Weed Ashes, .	bales and barls	—	3,220	3,220
Barilla, .	bales and barls	—	1,340	1,340
Kelp, .		—	98	98
Herrings, .	barrels	—	10,811	10,811
Flour, .	sacks and bags	—	5,955	5,955
Seed Potatoes, .	tons	—	1,259	1,259
Oak Bark, .	tons	—	700	700
Hoops, .	barrels	—	900	900
Timber, .	loads	—	2,412	2,412
Deals, .	hundreds	—	2,700	2,700
Staves, .	hundreds	—	17,396	17,396
Tallow, .	casks	—	741	741
Hides, .	tons	—	1,394	1,394
" .	bales	—	626	626
" .	bundles	—	484	484
" .	number	—	1,399	1,399
Salt, .	tons	—	3,640	3,640
Slates, .	tons	—	1,032	1,032
Coal, .	tons	—	13,966	13,966
Soap, .	cwts.	—	3,157	3,157
Rice, .	bags	—	28	28
Starch, .	barrels	—	25	25
Saltpetre, .	barrels	—	70	70
Valonia, .	cwts.	—	4,023	4,023
Lathwood, .	fathoms	—	21	21
Oakum, .	cwts.	—	120	120
Nuts, .	sacks and brls.	—	26	26
Spars, .	number	—	243	243
Vinegar, .	hhds. and brls.	—	200	200
" brls. punchs. and kegs not enumerated - -		—	400	400

APPENDIX B. No. 13.

Appendix B.
No. 13.

Excise Duty.

RETURN detailing the QUANTITY of MALT, SPIRITS, and MALT LIQUORS, upon which an EXCISE DUTY was paid during the Year 1836, specifying the AMOUNT, and the names of the towns in Ireland in which the DUTY was paid.

COLLECTIONS.	TOWNS.	MALT.				SPIRITS.			
		Bushels.	Amount of Duty.			Gallons.	Amount of Duty.		
			£	s.	d.		£	s.	d.
Armagh	Armagh	16,496	1,845	10	3	31,677	3,694	3	0
	Middletown	—	—			43,512	5,076	8	0
	Ballygawley	6,103	610	6	0	—	—		
	Aughnacloy	7,450	745	0	0	—	—		
	Monaghan	7,563	956	6	0	—	—		
	Dungannon	3,043	304	6	0	143,422	16,732	11	4
	Donaghmore	8,502	850	4	0	—	—		
	Lurgan	37,663	3,766	6	0	149,749	17,470	14	4
	Portadown	4,923	635	17	9	50,816	5,928	10	8
Athlone	Athlone	17,600	2,273	6	8	124,932	14,575	8	0
	Longford	7,180	927	8	4	83,354	9,724	12	8
	Roscommon	2,153	278	1	11	—	—		
	Strokestown	2,850	368	2	6	—	—		
	Castlerea	457	59	0	7	41,919	4,890	11	0
	Boyle	1,280	138	10	0	...	—		
Clonmel	Clonmel	56,514	7,299	14	6	407,455	47,648	12	9
	Carrick-on-Suir	13,941	1,800	14	3	...	—		
	Cashel	1,195	154	7	1	50,784	5,924	16	0
	Thurles	5,931	766	1	9	47,251	5,512	12	4
	Holycross	2,304	297	12	0	—	—		
	Nenagh	5,254	678	14	10	—	—		
	Borrisakane	6,050	781	11	9	—	—		
	Cloughjordan	5,755	743	7	1	71,123	8,297	13	8
	Templemore	390	50	7	6	—	—		
Coleraine	Coleraine	5,212	521	4	0	26,157	3,155	10	0
	Ballyronan	—	—			52,924	6,174	9	4
	Ballymoney	12,992	1,299	4	0	102,792	11,992	8	0
	Bushmills	11,636	1,169	8	1	10,158	1,185	2	0
	Newtownlimavady	6,478	647	16	0	41,425	4,832	18	4
	Maghera	2,042	204	4	0	—	—		
	Magherafelt	3,562	414	0	2	—	—		
	Antrim	8,445	844	10	0	—	—		
	Ballymena	3,393	339	6	0	41,778	4,874	2	0
Cork	Cork	263,671	34,057	11	4	1,256,325	169,252	18	4
	Bandon	25,351	3,274	10	1	107,395	12,529	8	4
	Kinsale	4,245	548	6	3	—	—		
	Dunmanway	1,384	178	15	4	—	—		
	Skibbereen	7,160	924	16	8	—	—		
	Clonakilty	7,266	938	10	6	—	—		
Drogheda	Drogheda	71,384	9,220	8	8	370,031	43,255	7	0
	Navan	4,006	517	8	10	15,790	1,842	3	4
	Kells	509	65	14	11	—	—		
	Virginia	992	128	2	8	—	—		
	Killeshandra	1	0	2	7	—	—		
	Cavan	1,727	223	1	5	—	—		
	Belturbet	1,287	166	4	9	189,729	22,135	1	0
Dublin	Dublin	43,283	5,590	16	1	2,672,350	321,779	8	10
Dundalk	Dundalk	105,526	13,021	19	11	394,756	46,088	9	0
	Castlebellingham	15,359	1,983	17	5	—	—		
	Carrickmacross	14,964	1,932	17	0	168,509	19,659	7	8
	Ardee	64,483	8,329	1	1	—	—		
	Newry	15,528	1,848	4	7	167,374	19,526	19	4
	Warrenpoint	6,911	768	4	11	—	—		
	Clones	4,160	416	0	0	—	—		
	Castleblaney	469	60	11	7	—	—		
Foxford	Castlebar	2,597	259	14	0	—	—		
	Westport	12,932	1,293	4	0	93,601	10,920	2	4
	Tuam	7,273	764	17	4	—	—		
	Ballinrobe	2,231	253	6	4	—	—		
	Clare	246	24	12	0	—	—		
	Ballina	8,399	840	9	11	—	—		
Galway	Galway	36,480	4,707	10	9	373,198	43,539	15	4
	Ballinasloe	5,894	761	7	11	—	—		
	Loughrea	3,757	485	5	7	—	—		
	Oranmore	369	47	13	3	—	—		
	Carried forward	1,014,201	125,403	16	8	7,330,286	888,220	3	11

Appendix B.
No. 13.

Excise Duty.

EXCISE DUTY—*continued.*

COLLECTIONS.	TOWNS.	MALT.				SPIRITS.			
		Bushels.	Amount of Duty.			Gallons	Amount of Duty.		
			£	s.	d.		£	s.	d.
	Brought forward	1,014,201	125,403	16	8	7,330,286	888,220	3	11
Kilkenny	Kilkenny	54,624	7,055	12	0	250,002	29,166	18	0
	Carlow	59,577	7,695	7	3	77,784	9,074	16	0
	Leighlinbridge	70,619	9,121	12	5	—	—		
	Tullow	3,861	498	14	3	—	—		
	Mountmellick	24,314	3,140	11	2	41,061	4,790	9	0
	Ballinakill	2,123	274	4	5	—	—		
	Castlecomer	2,010	259	12	6	—	—		
Limerick	Limerick	61,131	7,896	3	5	532,272	62,098	8	0
	Ennis	6,237	805	12	3	—	—		
Lisburn	Lisburn	8,779	985	13	5	—	—		
	Comber	—	—			163,583	19,084	13	8
	Carrickfergus	—	—			15,482	1,806	4	8
	Hillshorough	12,820	1,391	9	10	91,274	10,679	2	4
	Belfast	85,155	9,943	5	11	1,081,051	126,164	0	0
	Newtownards	19,588	2,113	8	5	—	—		
	Downpatrick	33,930	3,765	17	9	47,353	5,524	10	4
Londonderry	Londonderry	70,516	7,184	7	11	504,677	58,878	19	8
	N. T. Cunningham	3,908	390	16	0	—	—		
	Strabane	5,311	531	2	0	—	—		
	Letterkenny	107	13	8	3	—	—		
	Ramelton	1,794	179	8	0	—	—		
	Burt	—	—			65,711	7,666	5	8
	Omagh	4,673	467	6	0	3,507	409	3	0
	Gortin	358	35	16	0	—	—		
	Newtownstewart	172	17	4	0	—	—		
Mallow	Mallow	832	107	9	4	—	—		
	Kanturk	252	32	11	0	—	—		
	Fermoy	22,055	2,848	15	5	—	—		
	Clogheen	7,211	931	8	5	—	—		
	Middleton	96,192	12,424	16	0	597,533	70,266	6	2
	Youghal	158	20	8	2	—	—		
Maryborough	Birr	18,599	2,402	7	5	232,155	27,084	15	0
	Roscrea	22,803	2,945	7	9	126,990	14,815	10	0
	Mountrath	8,134	1,050	12	10	—	—		
	Tullamore	12,868	1,662	2	4	82,123	9,581	0	4
	Edenderry	111	14	6	9	—	—		
	Kilheggan	4,412	569	17	8	61,871	7,218	5	8
	Mullingar	5,640	728	10	0	—	—		
Naas	Kilcock	8,107	810	14	0	45,547	5,313	16	4
	Leixlip	—	—			14,436	1,684	4	0
	Naas	1,031	133	4	8	—	—		
	Monastereven	9,211	2,481	8	5	159,241	18,578	2	4
	Athy	11,016	1,422	18	0	—	—		
	Baltinglass	316	40	16	4	—	—		
	Wicklow	10,486	1,354	8	10	—	—		
	Bray	31,085	4,015	2	11	—	—		
	Newtown	598	77	4	10	—	—		
Sligo	Sligo	23,735	2,400	15	5	181,863	21,217	7	0
	Enniskillen	4,214	421	8	0	33,268	3,881	5	4
	Lowtherstown	154	19	17	10	—	—		
	Donegal	983	98	6	0	—	—		
	Ballyshannon	8,234	823	8	0	114,631	13,373	12	4
Tralee	Tralee	8,610	1,112	2	6	56,770	6,623	3	4
	Killarney	2,381	307	10	11	—	—		
	Newcastle	4,900	632	18	4	—	—		
Waterford	Waterford	76,182	9,840	3	6	—	—		
	Dungarvan	17,181	2,219	4	3	—	—		
	Lisburn	1,913	247	1	11	—	—		
	Clashmore	—	—			317,552	37,567	15	2
	New Ross	33,036	4,267	3	0	85,811	10,011	5	8
	Thomastown	1,820	235	1	8	—	—		
	Graigue	7,497	968	7	3	—	—		
Wexford	Wexford	181,288	23,416	7	4	202,449	24,001	7	8
	Enniscorthy	73,896	9,544	18	0	14,777	1,723	19	8
	Newtownbarry	3,096	399	18	0	—	—		
	Arklow	9,081	1,172	19	3	—	—		
	Gorey	405	52	6	3	—	—		
	Totals	2,285,531	283,424	18	4	12,531,060	1,496,505	10	3

NOTE.—Malt Liquors not being subject to an Excise Duty, no account of the quantity made in Ireland, can be furnished by this Department.

G. A. COTTRELL, Insp. Gen^{l}. Acc^{t}.

EXCISE OFFICE, LONDON, 8*th August*, 1837.

APPENDIX B. No. 14.

A STATEMENT of the Number of Registered Corn Mills, Corn Kilns, Distilleries, Breweries, Maltsters' Establishments, Paper Manufactories, Glass Works, Tobacco Manufactories, Tobacco Dealers, Tea Dealers, and Retailers of Spirits, in each Excise District in Ireland; with the total Number of such Establishments Registered in Scotland, England, Wales, and London; on the 10th July, 1835; also the Gross Receipts of Excise Duties in England, Scotland, and Ireland in Six Years preceding.—Compiled from the Appendix to the Twentieth Report of the Excise Inquiry Commissioners.

Appendix B.
No. 14.
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Statement of the Number of Registered Corn Mills, &c.

Excise Districts in Ireland, and Principal Towns in Each.	Corn Mills.	Corn Kilns.	Distilleries.	Breweries.	Maltsters.	Paper Manufactories	Glass Works	Tobacco Manufactories	Tobacco Dealers.	Tea Dealers.	Retailers of Spirits.
1 ARMAGH.—Armagh, Portadown, Lurgan, county *Armagh.*—Monaghan (*see* 5).—Caledon, Aughnacloy, Ballygawley, Dungannon, and Cookstown, county *Tyrone.*	102	121	7	8	16	2	-	7	1,139	1,131	1,163
2 LONDONDERRY.—Omagh, Strabane, Newtownstewart, and Fintona, county *Tyrone.*—Londonderry.—Letterkenny, Buncrana, Ramelton, Raphoe, &c., county *Donegal* (*see also* 7).	284	385	6	6	16	3	-	8	605	482	979
3. COLERAINE.—Dungiven, Newtownlimavady, Magherafelt, and Coleraine, county *Londonderry.*	97	141	6	6	10	10	-	2	987	1,005	1,006
4. LISBURN.—Larne, Carrickfergus, Belfast, and Lisburn, county *Antrim.*—Newtownards, Downpatrick, Castlewellan, Saintfield, Hillsborough, and Banbridge, county *Down.*	186	211	8	12	17	2	1	21	1,521	1,926	1,800
5. DUNDALK.—Newry and Warrenpoint, county *Down.*—Dundalk and Ardee, county *Louth.*—Carrickmacross, Ballybay, Castleblayney, and Clones, county *Monaghan.*	148	121	4	7	33	-	-	14	700	772	1,075
6. DROGHEDA.—Drogheda, co. of the Town.—Balbriggan, co. *Dublin.*—Navan, Trim, Athboy, Kells, and Oldcastle, co *Meath.*—Virginia, Ballyborough. Cavan, Belturbet, and Killysandra, county *Cavan.*	171	225	4	8	11	-	-	11	750	731	894
7. SLIGO.—Enniskillen, Irvinestowne, &c., county *Fermanagh.*—Ballyshannon, Donegal, &c., county *Donegal* (*see* 2).—Manorhamilton, &c., county *Leitrim* (*see* 8).—Sligo, Ballymote, &c., co. *Sligo.*	77	149	4	7	10	-	-	8	450	352	561
8. ATHLONE.—Mohill, and Carrick-on-Shannon, county *Leitrim.*—Longford, Granard, Ballymahon, county *Longford.*—Castlepollard and Athlone, county *Westmeath* (*see* 11).—Boyle, Castlerea, Strokestown, and Roscommon, county *Roscommon.*	174	263	5	7	11	-	-	3	696	505	898
9. FOXFORD (Mayo).—Ballina, Killalla, Castlebar, Westport, Newport, Swineford, Foxford, Claremorris, Ballinrobe, and Hollymount, county *Mayo.*—Headford and Tuam, county *Galway.*	34	62	1	12	10	-	-	17	183	187	417
10. GALWAY.—Clifden, Galway, Gort, Loughrea, and Ballinasloe, county *Galway.*	10	-	3	13	17	1	-	18	240	157	474
11. MARYBORO'.—Mullingar and Kilbeggan, county *Westmeath* (*see* 8).—Edenderry, Tullamore, and Birr, *King's Co.*—Roscrea, co. *Tipperary* (*see* 15).—Mountrath, Maryboro', &c. *Queen's Co.* (*see* 14).	106	-	9	15	21	-	-	5	406	440	785
12. NAAS.—Maynooth, Naas, Kilcullen, Monasterevan, and Athy, county *Kildare.*—Wicklow and Bray, county *Wicklow* (*see* 21).—Also county *Dublin*, south of the Metropolis (*see* 6).	109	66	3	9	9	16	-	2	894	907	905
13. DUBLIN. The Metropolis.	-	-	7	23	14	1	2	34	845	808	1,197
14. KILKENNY.—Tullow, Carlow, and Leighlinbridge, county *Carlow.*—Mountmellick, Ballynakill, &c., *Queen's County.*—Castlecomer, Kilkenny, Callan, &c., county *Kilkenny* (*see* 20).	52	55	5	20	49	-	-	16	333	370	857
15. CLONMEL.—Cloughjordan, Nenagh, Templemore, Tipperary, Thurles, Cashel, Clonmel, and Carrick-on-Suir, county *Tipperary* (*see* 11 and 19).	80	97	3	13	15	-	-	20	185	301	858
16. LIMERICK.—Ennis, Kilrush, &c., county *Clare.*—Limerick, county *Limerick.*	-	-	2	10	12	5	-	19	281	275	799
17 TRALEE.—Rathkeale and Newcastle, co *Limerick.*—Listowel, Tralee, Killarney, Dingle, &c., co. *Kerry.*	35	34	1	7	7	-	-	8	288	174	495
18 CORK.—Bantry, Clonakilty, Kinsale, Skibbereen, Bandon, Macroom, Cork, &c., county *Cork.*	47	74	10	21	21	9	2	31	381	464	1,361
19. MALLOW.—Mallow, Kanturk, Charleville, Mitchelstown, Fermoy, Rathcormac, Middleton, and Youghal, co. *Cork.*—Also Clogheen, co. *Tipperary.*	36	50	2	7	12	7	-	18	309	343	886
20. WATERFORD.—Dungarvan, Lismore, Waterford, &c., county *Waterford.*—Thomastown and Graigue, county *Kilkenny.*—Ross, county *Wexford.*	48	83	2	11	19	1	1	18	299	314	894
21. WEXFORD.—Wexford, Enniscorthy, and Gorey, co. *Wexford.*—Arklow, &c., co. *Wicklow* (*see* 12).	86	159	3	14	58	-	-	11	497	529	653
TOTAL—IRELAND. - - - - -	1,882	2,296	95*	236	388	57	6	291	11,989	12,203	18,957
„ SCOTLAND, - - - -	none in	Return	248*	560	1,166	49	13	151	13,039	13,596	16,340
„ ENGLAND AND WALES, -	„	„	13*	41,918	12,595	436	172	303	148,850	79,181	47,384
„ LONDON, - - - - -	„	„	2*	244	9	6	22	82	10,152	6,298	4,262

* Exclusive of 19 Rectifiers' Distilleries in Ireland; 8, in Scotland; 105, in England; 44, in London.

Appendix B.
No. 14.

Gross Receipts of Excise Duties in England, Scotland, and Ireland, in Six Years preceding 1835.

GROSS RECEIPTS of EXCISE DUTIES in ENGLAND, SCOTLAND, and IRELAND, in Six Years preceding 1835.

Years.	England and Wales.	Scotland.	Ireland.
1829	£18,243,929	£2,770,110	£2,016,242
1830	17,420,714	2,960,306	1,973,856
1831*	14,323,298	2,576,965	2,193,079
1832†	14,370,008	2,280,728	2,198,759
1833	14,287,488	2,419,234	1,951,314
1834‡	12,303,650	2,477,734	1,975,331

* The Excise Revenue of 1831 is under the produce of 1830; as in 1830, the beer and cider duties of England and Scotland, and the leather tax of the United Kingdom, were repealed.

† The Revenue of 1832 exhibits an increase over 1831, except in Scotland, notwithstanding the repeal, in 1831, of the tax on printed cottons, of England and Scotland, and the repeal of the candle duty, in 1832.

‡ The Revenue of 1834 is under that of 1833, in consequence of the transfer of the tea duties from the Excise department to the Customs, and also of the repeal of the duty, till then payable on starch, in England and Scotland.

DEDUCTIONS from the PRECEDING TABLE 14, in Reference to the Commercial Circumstances of IRELAND, as contrasted with ENGLAND and SCOTLAND.

Deductions from Preceding Table 14.

THE population of England and Wales, in 1831, the period of the last census, having been 13,889,675, and there having been there, in 1835, 79,181 dealers in tea, which is now consumed by all classes in the United Kingdom, capable of purchasing it,—Ireland, to be on a parity of condition with England, in this respect, should have had, in 1835, 47,000 dealers in tea, instead of 12,203; her population, in 1831, having been 7,734,365

The population of Scotland having been, in 1831, only 2,365,930, a little more than one-sixth of the population in England, while the dealers in tea licensed there, in 1835, amounted to 13,596, a little more than one-sixth of the number in England and Wales,—it follows, that Scotland, in this respect, maintains a parity of condition with England; and that the trade in tea is a fair test of the circumstances of the population in the United Kingdom.

It might happen that the 12,203 dealers in Ireland, sell more tea than the 13,596 in Scotland, and that the consumption still bears a just proportion to the population in each country. This cannot be positively determined by items in the public accounts, it being impossible to show, at present, in what portion of the United Kingdom the teas are consumed after the Customs duties have been paid. However, the number of dealers is a strong indication of the extent of a trade; and to support it, in this case, there are the preceding amounts of Excise Revenue collected in Ireland and in Scotland. The Excise taxes of the two countries are now precisely similar, except that soap and bricks are taxed in Scotland, but not in Ireland. The soap duty of Scotland produced, in 1834, £92,248, and the brick duty, £8,100—in all, £100,348; which, deducted from the whole revenue, leaves £2,377,386, collected on articles also taxed in Ireland with precisely similar rates, while the Irish revenue from these articles amounted to only £1,975,331; whereas, were trade and the consumption in proportion to the population, and the country on equality of condition with Scotland, the Irish revenue would have been nearly £8,000,000.

Scotland certainly derived some revenue from paper and glass consumed out of it, and sent away after payment of the duties; but the whole produce of the Scottish Excise on these articles, was, in 1834, considerably under £200,000. The heavy Excise duties paid in the United Kingdom are levied where the articles are going into trade and use.

Thus, Ireland's disparity of condition, as compared with Scotland, is such that her Excise is £6,000,000 a year under the amount she would be capable of paying if her population were in equal circumstances with the Scottish population.

(Signed) W. STANLEY.

1st *June*, 1837.

Appendix B.
No. 15.

Return of Postage, 1830 and 1836.

APPENDIX B. No. 15.

RETURN showing the AMOUNT received at the POST OFFICES of the undermentioned TOWNS in IRELAND, for the Years 1830 and 1836.

Note.—The places marked thus * are Sub-Offices to the General Post Town they each respectively follow, and the amount of Postage collected at those places in the year 1836 will be found credited in the account of the Head Office.

COUNTIES.	TOWNS.	1830.			1836.		
		£	s.	d.	£	s.	d.
Antrim, -	Antrim, - -	348	3	2	432	4	0
	Ballycastle, - -	211	2	5	266	19	9
	*Dervock, - -	113	19	4½	–	–	–
	Ballymenagh, - -	692	3	10½	937	1	7
	*Broughshane, -	64	11	4½	–	–	–
	Ballymoney, -	364	17	10	519	9	10
	Belfast, - -	9,437	19	10½	11,784	19	10
	*Ballyclare, - -	83	19	0½	–	–	–
	Bushmills, - -	137	13	11	228	11	2
	Carrickfergus, - -	327	1	5½	424	19	10
	Crumlin, - -	151	19	4	153	8	2
	Cushendall, - -	91	18	0½	107	13	8
	Larne, - -	363	6	4	518	13	5
	*Glenarm, - -	89	4	1½	–	–	–
	Lisburn, - -	645	3	7	812	10	4
	Randalstown, - -	96	15	1	154	8	10
	*Toome, - -	48	7	9½	–	–	–
	Portglenone, - -	91	13	11½	246	10	6
	Total, - -	13,360	0	7	16,587	10	11
Armagh, -	Armagh, - -	1,347	3	10	1,915	11	1
	*Rich-hill, - -	74	5	2½	–	–	–
	Keady, - -	147	11	7½	189	17	3
	Loughgall - -	133	9	2	179	18	8
	Lurgan, - -	361	1	6	592	12	11
	*Glenavy, - -	37	19	6½	–	–	–
	Markethill, - -	168	17	8½	272	17	10
	Portadown, - -	212	11	6	306	14	8
	Tanderagee, - -	201	4	0	273	12	10
	Tynan, - -	105	6	2½	221	9	3
	Total, - -	2,789	10	3½	3,952	14	6
Carlow, - -	Bagnalstown, - -	275	3	8½	388	4	4
	Carlow, - -	1,391	4	5½	1,441	6	9
	Leighlinbridge, -	239	3	7	341	13	10
	*Myshall, - -	50	12	2½	–	–	–
	Tullow, - -	334	15	5	429	5	5
	Total, - -	2,290	19	4½	2,600	10	4
Cavan, - -	Ballyconnel, - -	181	17	3½	365	2	0
	*Swanlinbar, - -	100	0	7½	–	–	–
	Bailyborough, - -	160	9	9½	222	0	9
	Belturbet, - -	389	10	11½	524	6	7
	Ballyjamesduff, - -	127	6	6½	147	19	10
	Cavan, - -	761	16	2	817	4	2
	Cootehill, - -	395	6	5	443	9	11
	Crossdoney, - -	141	0	7½	338	4	10
	*Arva, - -	88	9	4½	–	–	–
	*Scrabby, - -	24	3	9½	–	–	–
	Kingscourt, - -	183	4	1½	225	8	0
	Killysandra, - -	345	2	11	439	3	6
	Mount Nugent, - -	114	15	10½	147	19	1
	Stradone, - -	92	12	0	101	6	7
	Virginia, - -	113	19	6½	146	10	2
	Total, - -	3,219	16	0½	3,918	15	5

Appendix B.
No. 15.

Return of Postage.
1830 and 1836.

COUNTIES.	TOWNS.	1830.			1836.		
		£	s.	d.	£	s.	d.
Clare, - -	Ballingarry, - -	76	8	2½	117	4	10
	Bunratty, - -	36	0	5½	41	18	5
	Curofin, - -	92	16	5	67	10	6
	Ennis, - -	826	4	1	1,032	2	2
	Ennistimon, - -	187	12	6	129	14	6
	Kildysart, - -	63	13	3	80	13	9
	Killaloe, - -	225	6	5½	422	18	0
	Kilrush, - -	252	17	5½	402	0	8
	Knock, - -	43	11	1	65	2	7
	Miltown Malbay,	101	17	9½	113	6	3
	Newmarket-on-Fergus, -	168	18	11	232	2	5
	*Scariff, - -	80	6	4½	–	–	–
	Six-Mile-Bridge, -	89	5	4½	83	3	9
	Total, - -	2,244	18	4½	2,787	17	10
Cork, - -	Ballincollig, - -	231	19	11	413	14	10
	Bandon, - -	637	17	1	1,205	5	4
	*Dunmanway, -	137	7	8½	–	–	–
	Bantry, - -	250	13	11½	334	17	3
	Buttevant, - -	293	14	10	290	18	2
	Castletown, - -	192	12	11½	220	13	10
	Castlemartyr, - -	105	10	5½	170	18	6
	Charleville, - -	327	11	4½	448	16	2
	Cloghnakilty, - -	249	1	10	351	7	7
	Cloyne, - -	253	14	3	295	6	11
	Cork, - -	10,485	18	5	13,236	12	6
	Cove, - -	977	0	1	1,035	18	4
	*Passage-west, -	151	4	8	–	–	–
	Doneraile, - -	260	17	8½	276	7	10
	Fermoy, - -	861	2	1	1,185	10	10
	*Castletownroche, -	60	17	6	–	–	–
	Innishannon, - -	107	6	5½	155	3	8
	Kanturk, - -	239	17	0	243	8	11
	Kildorrery, - -	63	19	9	66	13	4
	Kilworth, - -	101	16	10	141	15	0
	Kinsale, - -	685	6	6	675	2	1
	Macroom, - -	225	19	3	234	17	10
	Mallow, - -	699	9	11½	830	1	2
	Middleton, - -	294	11	8	488	3	5
	Millstreet, - -	68	19	0	111	3	5
	Mitchelstown, - -	263	15	1	394	9	2
	Rathcormuck, - -	156	7	5	214	19	2
	Rosscarbery, - -	148	15	0½	261	12	9
	Skibbereen, - -	507	3	6½	832	17	3
	Youghal, - -	1,114	3	6	1,298	11	6
	Total, - -	20,154	15	10	25,415	6	9
Donegal, - -	Ardara, - -	52	0	10	208	15	9
	Ballyshannon, - -	569	14	10	852	15	4
	Buncrana, - -	157	7	8½	155	5	7
	Carn, - -	116	3	1½	211	1	0
	Castlefin, - -	65	1	7½	57	8	1
	*Churchhill, - -	61	13	1½	–	–	–
	Donegal, - -	341	4	10½	477	12	7
	Dunfanaghy, - -	156	8	6	152	8	7
	Killybegs, - -	113	1	5½	170	18	7
	Letterkenny, - -	381	16	3	489	17	7
	Moville, - -	142	14	2½	232	2	4
	*Narin, - -	29	0	10	–	–	–
	Ramelton, - -	304	4	1	454	8	10
	Raphoe, -	185	1	6½	187	16	5
	Stranorlar, - -	177	16	6½	205	17	16
	*Rutland, - -	123	13	0½	–	–	–
	Total, - -	2,977	2	7	3,856	8	6

Appendix B.
No. 15.

Return of Postage.
1830 and 1836.

COUNTIES.	TOWNS.	1830.			1836.		
		£	s.	d.	£	s.	d.
Down,	Banbridge,	535	14	8	897	4	11
	*Ballynahinch,	126	2	5½	–	–	–
	Bangor,	171	15	4	165	8	4
	Castlewellan,	259	14	0½	422	8	4
	Clough,	184	1	8	156	18	10
	Comber,	125	3	0½	223	15	10
	Donaghadee,	216	12	6½	235	19	2
	Downpatrick,	593	19	9½	928	9	10
	*Ardglass,	90	0	1	–	–	–
	Dromore,	231	11	11	393	0	0
	Gilford,	163	11	4	177	8	7
	Hillsborough,	223	7	10	261	8	3
	Hollywood,	177	16	8½	163	10	0
	Kilkeel,	142	4	2	139	7	1
	*Killinchy,	57	2	6	–	–	–
	*Killough,	77	14	4	–	–	–
	Killyleigh,	126	17	9½	209	11	5
	*Kircubbin,	64	1	3½	–	–	–
	Loughbrickland,	103	13	4	209	8	6
	Moira,	69	0	7	88	15	4
	Newry,	2,841	9	5	2,738	10	10
	*Carlingford,	107	13	0	–	–	–
	Newtownards,	225	0	4	356	2	0
	*Newtownhamilton,	95	8	9	–	–	–
	Portaferry,	164	19	3	193	3	0
	Rathfriland,	157	3	8½	247	14	0
	Rostrevor,	308	11	8	359	14	3
	*Saintfield,	86	13	6	–	–	–
	*Strangford,	110	7	3½	–	–	–
	Warrenpoint,	215	4	3½	256	16	8
	Total,	8,052	16	7½	8,824	15	2
Dublin,	Balbriggan,	326	19	3	402	17	7
	Cabinteely,	55	13	3	141	6	3
	Clonee,	66	1	0	77	9	6
	Dublin,	95,819	17	3	70,563	4	10½
	†Blackrock,	–	–	–	681	10	6
	†Booterstown,	–	–	–	324	1	0
	†Chapelizod,	–	–	–	94	19	4
	†Clontarf,	–	–	–	223	12	0
	†Drumcondra,	–	–	–	180	5	2
	†Dundrum,	–	–	–	157	10	7
	†Enniskerry,	–	–	–	237	5	10
	†Finglass,	–	–	–	156	13	6
	†Golden-Ball,	–	–	–	53	13	4
	†Kingstown,	–	–	–	1,095	17	6
	†Raheny,	–	–	–	229	13	7
	†Rathfarnham,	–	–	–	329	8	11
	Howth,	73	18	8½	87	14	11
	Lucan,	159	8	9½	187	2	3
	Rathcoole,	88	4	9	133	7	0
	Swords,	234	15	6	322	1	3
	*Malahide,	54	15	0½	–	–	–
	Tallaght,	40	0	7	46	19	9
	Total,‡	96,919	14	1½	75,726	14	7½
Fermanagh,	Brookboro'	118	9	1	209	18	3
	Enniskillen,	898	3	3½	1,696	10	0
	*Five-Mile-Town,	61	2	3½	–	–	–
	*Florence-Court,	86	19	7½	–	–	–
	Irvinstown,	101	3	5	146	4	3
	Kish,	98	4	7	195	7	2
	Lisnaskea,	145	6	1½	213	2	9
	*Tempo,	15	4	11	–	–	–
	Total,	1,524	13	4	2,461	2	5

In the year 1830, the revenue of the Towns marked thus † was included in that for Dublin.

‡ This sum includes the amount of Postage repaid to the Ordnance, which, on an average, was £500 per week. By the Act of 2nd Wm. IV., c. 15, the Ordnance are allowed to send and receive letters free.

Appendix B.
No. 15.

Return of Postage, 1830 and 1836.

COUNTIES.	TOWNS.	1830.			1836.		
		£	s.	d.	£	s.	d.
Galway,	Ahascragh,	295	5	1	292	14	1
	*Ardrahan,	–	–	–	188	13	8
	*Burrin,	45	5	3	–	–	–
	Aughrim,	82	17	11½	250	16	3
	Kilconnell,	110	9	11	–	–	–
	Ballinasloe,	601	4	3	980	8	4
	Castleblakeny,	187	10	0½	264	16	8
	Clifden,	151	6	3½	132	14	1
	Craughwell,	101	11	8½	268	17	6
	*Athenry,	98	18	6½	–	–	–
	*Monivae,	39	17	2½	–	–	–
	Dangan,	68	9	6	133	14	6
	Eyrecourt,	167	0	7	240	16	5
	Galway,	2,492	19	2	2,766	16	9
	*Outerard,	64	2	4	–	–	–
	Clare,	223	0	6½	288	19	5
	Gort,	280	12	6	329	10	1
	Headfort,	144	15	11	157	17	2
	Loughrea,	668	7	4½	824	7	0
	Oranmore,	249	10	8	194	5	5
	Portumna,	194	13	9½	263	3	1
	Tuam,	734	17	4½	1,071	19	10
	*Dunmore,	114	14	6½	–	–	–
	Total,	7,117	10	6½	8,650	10	3
Kerry,	Cahirciveen,	119	7	10½	269	6	6
	Milltown,	112	14	0½	–	–	–
	Valentia,	29	15	6	–	–	–
	Dingle,	246	17	1	282	15	3
	Listowell,	234	15	2½	253	13	1
	Kenmare,	149	3	6½	226	5	4
	Killarney,	593	15	9	693	14	4
	Tarbert,	130	8	7½	150	15	3
	*Ballylongford,	35	8	11	–	–	–
	*Shanagolden,	63	18	11½	–	–	–
	Tralee,	1,182	0	1½	1,511	18	6
	*Castleisland,	64	15	9½	–	–	–
	Total,	2,963	1	5	3,388	8	3
Kildare,	Athy,	420	1	5	519	10	6
	Ballytore,	213	19	6½	260	6	4
	Castledermot,	148	14	9	151	6	8
	Celbridge,	143	3	3	247	18	0
	Enfield,	77	5	9	125	14	1
	Kildare,	217	14	2½	252	6	5
	Kilcullen,	263	17	5½	402	14	0
	*Dunlavin,	63	6	2	–	–	–
	Kilcock,	134	16	8	249	2	7
	Leixlip,	120	19	4	126	8	2
	Monasterevan,	297	12	8½	256	4	0
	Maynooth,	222	13	5	229	3	4
	Naas,	452	3	6	647	3	7
	*Clane,	126	1	5½	–	–	–
	New Bridge,	218	6	5	252	7	1
	Rathangan,	160	5	9	206	1	3
	Total,	3,281	1	9½	3,926	6	0

Appendix B.
No. 15.

Return of Postage.
1830 and 1836.

COUNTIES.	TOWNS.	1830.			1836.		
		£	s.	d.	£	s.	d.
Kilkenny, -	Castlecomer, - -	196	3	6	305	12	4
	*Ballyragget, - -	73	4	5½	–	–	–
	Callan, - -	233	7	3½	317	16	6
	Durrow, - -	166	10	2½	232	6	5
	Freshford, - -	158	15	11	194	19	6
	Gore's-bridge, - -	203	19	10½	366	0	11
	*Graig, - -	121	7	2	–	–	–
	Gowran, - -	77	19	1½	88	12	4
	Johnstown, - -	254	3	4½	293	15	5
	Kilkenny, - -	1,831	15	7½	2,112	11	6
	Piltown, - -	119	15	7	170	15	6
	Thomastown, - -	284	4	3	605	9	9½
	Knocktopher, - -	129	17	0½	–	–	–
	Total, - -	3,851	3	5	4,688	0	2½
King's County, -	Banagher, -	291	14	9	305	14	11
	Clara, -	168	3	4½	342	5	6
	Cloghan, -	124	10	8½	142	1	8
	*Ferbane, -	74	11	10½	–	–	–
	Edenderry, -	287	10	3½	304	4	1
	Frankford, -	146	2	5	252	8	0
	Moneygall, - -	180	5	1	236	18	5
	Philipstown, - -	125	18	7½	208	15	2
	*Geashell, - -	56	1	0½	–	–	–
	Parsonstown, - -	863	4	3	1,267	12	4
	*Kinnety, - -	93	16	5½	–	–	–
	Shinrone, - -	151	6	7½	172	19	1
	Tullamore, - -	646	8	7	688	9	9
	Total, - -	3,209	14	1	3,921	8	11
Leitrim, -	Ballynamore, - -	169	5	10½	234	9	0
	Carrick-on-Shannon, -	354	11	5	810	18	6
	*Keadue, - -	108	18	4	–	–	–
	*Cashcarrigan, - -	80	4	9½	–	–	–
	Dromod, - -	–	–	–	125	16	6
	Drumsna, - -	286	18	9½	354	14	9
	Manor Hamilton, -	150	16	10	202	7	6
	Mohill, - -	227	0	7½	296	13	7
	*Ruskey, - -	69	8	10½	–	–	–
	Total, -	1,447	5	6½	2,024	19	10
Limerick, -	Adair, - -	101	6	9½	134	7	8
	*Askeaton, - -	74	8	8½	–	–	–
	Bruff, - -	219	19	3½	305	3	5
	Castleconnel, - -	264	6	2½	283	15	4
	Kilmallock, - -	168	13	11	280	14	11
	Limerick, - -	5,652	19	10½	7,203	7	1
	*Caherconlish, -	49	3	1	–	–	–
	*Croome, - -	82	9	9	–	–	–
	*Pallasgreen, - -	103	12	2½	–	–	–
	*Pallaskenry, - -	102	5	1	–	–	–
	*Tulla, -	134	8	1½	–	–	–
	Newcastle, -	197	13	6½	398	10	4
	*Abbeyfeale, -	15	2	3½	–	–	–
	Rathkeale, - -	376	1	1½	579	15	11
	Total, - -	7,542	10	0	9,185	14	8

Appendix B.
No. 15.

Return of Postage, 1830 and 1836.

COUNTIES.	TOWNS.	1830.			1836.		
		£	s.	d.	£	s.	d.
Londonderry,	Castle-Dawson,	100	1	8	181	14	2
	*Bellaghy,	35	12	0½	–	–	–
	Coleraine,	1,263	2	9½	1,451	9	4
	Derry,	3,038	5	11	3,921	12	1
	Dungiven,	137	13	9½	157	3	5
	Garvagh,	119	12	4½	226	2	10
	Maghera,	127	11	6	139	8	9
	Magherafelt	227	1	0½	279	11	4
	Moneymore	143	6	5	276	12	7
	Newtown Limavady,	478	3	11	469	6	7
	Tubbermore,	70	10	4	113	15	0
	*Kilrea,	95	6	4	–	–	–
	Total,	5,836	8	1½	7,216	16	1
Longford,	Ballymahon,	364	4	6	361	1	2
	*Colehill,	88	9	4	–	–	–
	Edgeworthstown,	240	5	10½	336	6	2
	Granard,	385	0	8	492	5	8
	Longford,	997	11	10½	1,136	14	6
	*Lanesboro'	89	15	6	–	–	–
	Newtown-Forbes,	96	17	8½	102	2	0
	Total,	2,262	5	5½	2,428	9	6
Louth,	Ardee,	317	8	6½	546	4	3
	*Collon,	91	7	7	–	–	–
	Castlebellingham,	252	17	9½	295	18	7
	Drogheda,	1,949	2	3½	2,244	7	1
	Dundalk,	1,671	7	11	1,895	12	0
	*Forkhill,	64	1	8½	–	–	–
	Dunleer,	175	8	11	221	7	1
	Flurrybridge,	83	0	3½	75	12	1
	Lurgangreen,	51	5	2	66	18	6
	*Tallanstown,	51	8	1	–	–	–
	Total,	4,707	8	3½	5,345	19	7
Mayo,	Ballaghaderin,	135	0	7½	157	9	5
	Ballina,	642	14	9	1,211	11	9
	*Belmullet,	114	9	0½	–	–	–
	*Crossmolina,	83	18	1½	–	–	–
	Ballinrobe,	246	15	4	347	17	10
	Ballyglass,	145	17	2	188	4	3
	Castlebar,	849	13	8½	857	3	7
	*Cong,	65	11	9½	–	–	–
	*Foxford,	92	16	3	–	–	–
	Hollymount,	148	0	2½	255	6	11
	Killala,	276	2	6	330	0	10
	*Rathlacken,	42	0	1½	–	–	–
	Swinford,	141	18	1½	152	11	3
	Westport,	810	18	11	948	13	8
	*Newport,	101	2	11	–	–	–
	*Deal-Castle,	4	12	3	–	–	–
	Total,	3,901	11	10	4,448	19	6
Meath,	Ashbourne,	47	5	3	161	0	10
	Athboy,	200	11	7	244	14	9
	Clonard,	95	0	4½	112	18	10
	Dunshaughlin,	157	11	7½	131	16	2
	Kells,	574	10	7	715	4	7
	*Nobber,	104	0	9	–	–	–
	Navan,	601	13	1	663	11	3
	Oldcastle,	184	1	11½	208	7	2
	Slane,	134	3	5½	148	8	6
	Trim,	273	14	11	370	12	9
	*Summerhill,	110	8	8	–	–	–
	Total,	2,483	2	3	2,756	14	10

Appendix B.
No. 15.

Return of Postage.
1830 and 1836.

COUNTIES.	TOWNS.	1830.			1836.		
		£	s.	d.	£	s.	d.
Monaghan, -	Ballibay, - -	274	13	2	321	2	4
	Carrickmacross, - -	398	0	9½	471	2	10
	Castleblaney, - -	236	11	9½	378	2	9
	Clones, - -	378	11	4½	581	2	1
	Emyvale, - -	23	3	1	52	12	8
	Monaghan, - -	681	12	5½	918	6	10
	*Glasslough, - -	88	12	1½	–	–	–
	*Newbliss, - -	87	6	11	–	–	–
	Total, - -	2,168	11	8½	2,722	9	6
Queen's County,	Abbeyleix, - -	316	1	7	362	13	4
	*Ballinakill, - -	98	1	5	–	–	–
	Ballybrittas, - -	75	12	9½	78	19	0
	Burros-in-Ossory, -	150	7	1	160	18	8
	Emo, - -	142	6	6	82	18	0
	Maryborough, - -	363	14	9½	436	11	1
	Mountmellick, - -	340	1	4	586	1	2
	*Clonaslie, - -	61	2	1	–	–	–
	Mountrath, - -	375	2	6	444	16	2
	Portarlington, - -	443	5	1	428	9	0
	Rathdowney, - -	200	8	11	246	12	6
	Stradbally, - -	308	9	8	280	5	7
	Total, -	2,874	13	9	3,108	4	6
Roscommon, -	Boyle, - -	539	7	11½	696	0	2
	Castlerea, - -	261	17	9½	339	17	3
	*Ballymoe, - -	80	15	5	–	–	–
	Elphin, - -	217	10	5	288	2	2
	Frenchpark, - -	129	18	1	272	10	6
	*Ballyhaunis, - -	56	18	9	–	–	–
	Roscommon, - -	609	3	8½	966	2	3
	*Athleague, - -	91	14	8½	–	–	–
	*Mount Talbot, -	98	18	10½	–	–	–
	Strokestown, - -	235	8	7	389	15	8
	Tulsk, - -	54	11	10	–	–	–
	Total, - -	2,376	6	1½	2,952	8	0
Sligo, -	Ballymote, - -	176	10	1½	353	2	4
	Collooney, - -	208	16	6	350	3	0
	* Dromahair, -	70	19	5	–	–	–
	Dromore-West, - -	130	5	4	222	11	10
	Sligo, - -	2,202	17	9½	2,659	14	0
	Total, - -	2,789	9	2	3,585	11	2
Tipperary, -	Burros-a-kane, - -	311	6	2½	388	3	3
	Caher, - -	387	19	1½	510	19	10
	Carrick-on-Suir, - -	612	17	11½	715	12	0
	Cashel, - -	601	3	1	842	19	5
	*Golden, - -	82	1	1½	–	–	–
	Clogheen, - -	273	3	4	277	14	1
	Clonmel, - -	2,454	4	7½	2,930	9	7
	Cloughjordan, - -	102	8	9	180	5	3
	Fethard, - -	260	19	6½	263	14	6
	Littleton, - -	66	0	0	252	10	11
	*Killynaule, - -	110	4	1	–	–	–
	*New Birmingham, -	52	11	10½	–	–	–
	Nenagh, - -	958	6	2½	1,026	8	7
	Newport, - -	155	3	9	178	10	0
	Roscrea, - -	814	8	4	873	7	8
	Templemore, - -	523	12	7½	778	6	3
	*Burrosoleigh, - -	93	10	8	–	–	–
	Thurles, - -	452	7	9½	559	15	2
	Tipperary, - -	724	16	7½	1,066	5	10
	Total, - -	9,037	5	8½	10,845	2	4

Appendix B.
No. 15.

Return of Postage,
1830 and 1836.

COUNTIES.	TOWNS.	1830.			1836.		
		£	s.	d.	£	s.	d.
Tyrone, -	Aughnacloy, - -	225	12	11	312	18	2
	Ballygawley, - -	170	15	7	129	15	2
	Caledon, - -	140	9	0½	191	1	4
	Clogher, - -	134	14	7	168	18	6
	Cookstown, - -	442	4	6	406	17	0
	Dungannon, - -	857	0	6	1,307	18	8
	Moy, - -	258	11	5	425	18	7
	*Blackwatertown, -	105	1	11½	–	–	–
	Newtownstewart, -	209	2	11	249	4	3
	Omagh, - -	648	4	4	1,198	8	0
	*Fintona, - -	102	13	5	–	–	–
	Stewartstown, - -	185	1	4	224	7	8
	Strabane, - -	1,029	6	2½	1,257	10	9
	*Castlederg, - -	96	8	1½	–	–	–
	*Dunamanagh, -	32	11	0	–	–	–
	Total, - -	4,637	17	10	5,872	18	1
Waterford, -	Cappoquin, - -	248	18	3½	281	13	3
	Dungarvan, - -	583	10	11½	759	15	2
	Kilmacthomas, - -	147	8	9½	199	5	5
	Lismore, - -	272	13	4½	271	3	7
	Tallow, - -	221	6	5½	278	6	8
	Waterford, - -	4,726	12	4	5,535	13	7
	*Dunmore East, -	96	7	2	–	–	–
	*Portlaw, - -	103	5	7½	–	–	–
	*Passage, - -	30	15	8½	–	–	–
	*Tramore, - -	103	17	7½	–	–	–
	Total, - -	6,534	16	4	7,325	17	8
Westmeath, -	Athlone, - -	1,347	9	6½	1,793	10	6
	Ballynacargy - -	211	7	5½	287	10	5
	Castlepollard, - -	215	9	2	227	10	9
	Castletowndelvin, -	103	2	10	217	2	2
	*Drumcree, - -	80	13	10	–	–	–
	Kilbeggan, - -	280	17	7	313	7	3
	Kinnegad, - -	137	18	0½	288	1	6
	*Killucan, - -	157	1	2½	–	–	–
	Moate, - -	360	14	7½	524	5	7
	*Ballymore, - -	88	13	11½	–	–	–
	Mullingar, - -	872	0	11	1,023	16	0
	Rathowen, - -	121	2	10	196	2	8
	Rochfort Bridge, - -	44	8	3	90	11	8
	Tyrrell's Pass, - -	163	15	4½	118	15	3
	Total, -	4,184	15	7½	5,080	13	9
Wexford, -	Arthurstown, - -	115	6	2½	407	12	8
	*Fethard, - -	92	17	6	–	–	–
	Camolin, - -	109	11	2½	122	18	2
	Enniscorthy, - -	838	12	11	1,095	15	5
	*Oulart, - -	77	16	9	–	–	–
	Ferns, - -	161	8	9½	108	5	8
	Gorey, - -	369	1	2	386	15	7
	Newtown Barry, - -	228	3	8½	270	8	8
	*Clonegal, - -	69	9	6	–	–	–
	Ross, - -	808	9	1½	1,045	2	10
	*Inistiogue, - -	76	10	6½	–	–	–
	Taghmon, - -	226	18	2½	276	7	3
	Wexford, - -	1,896	2	1½	2,134	4	8
	*Broadway, - -	75	3	3½	–	–	–
	Total, - -	5,145	11	0½	5,847	10	11

Return of Postage.
1830 and 1836.

COUNTIES.	TOWNS.	1830.			1836.		
		£	s.	d.	£	s.	d.
Wicklow, -	Arklow, - -	302	1	9½	251	14	5
	Ashford, - -	136	14	9½	220	0	10
	Baltinglass, - -	251	19	5	444	8	1
	*Hacketstown, -	69	18	9	–	–	–
	Bray, - -	542	17	10	585	4	5
	Carnew, - -	117	7	8½	115	14	5
	Delgany, - -	179	14	0	216	11	4
	Newtown-Mount-Kennedy,	266	9	2½	254	3	1
	Tinnehely, - -	104	16	9	121	5	0
	Rathdrum, - -	309	9	7	387	13	3
	Wicklow, - -	342	6	4½	356	2	7
	*Blessington, -	89	14	8½	119	18	3
	Total, - -	2,713	10	11	3,072	15	8

SUMMARY.

COUNTIES.	Year 1850.			Year 1836.		
	£	s.	d	£	s.	d.
Antrim, - -	13,360	0	7	16,587	10	11
Armagh, - -	2,789	10	3½	3,952	14	6
Carlow, - -	2,290	19	4½	2,600	10	4
Cavan, - -	3,219	16	0½	3,918	15	5
Clare, - -	2,244	18	4½	2,787	17	10
Cork, - -	20,154	15	10	25,415	6	9
Donegal, - -	2,977	2	7	3,856	8	6
Down, - -	8,052	16	7½	8,824	15	2
Dublin, - -	96,919	14	1½	75,726	14	7½
Fermanagh, - -	1,524	13	4	2,461	2	5
Galway, - -	7,117	10	6½	8,650	10	3
Kerry, - -	2,963	1	5	3,388	8	3
Kildare, - -	3,281	1	9½	3,926	6	0
Kilkenny, - -	3,851	3	5	4,688	0	2½
King's County, - -	3,209	14	1	3,921	8	11
Leitrim, - -	1,447	5	6½	2,024	19	10
Limerick, - -	7,542	10	0	9,185	14	8
Londonderry, - -	5,836	8	1½	7,216	16	1
Longford, - -	2,262	5	5½	2,428	9	6
Louth, - -	4,707	8	3½	5,345	19	7
Mayo, - -	3,901	11	10	4,448	19	6
Meath, - -	2,483	2	3	2,756	14	10
Monaghan, - -	2,168	11	8½	2,722	9	6
Queen's County, - -	2,874	13	9	3,108	4	6
Roscommon, - -	2,376	6	1½	2,952	8	0
Sligo, - -	2,789	9	2	3,585	11	2
Tipperary, - -	9,037	5	8½	10,845	2	4
Tyrone, - -	4,637	17	10	5,872	18	1
Waterford, - -	6,534	16	4	7,325	17	8
Westmeath, - -	4,184	15	7½	5,080	13	9
Wexford, - -	5,145	11	0½	5,847	10	11
Wicklow, - -	2,713	10	11	3,072	15	8
Total, - -	244,600	8	1½	254,527	15	8

APPENDIX B.

No. 16.

Appendix B.
No. 16.
Banks.

RETURN SHOWING THE NAMES OF THE TOWNS IN IRELAND IN WHICH JOINT STOCK BANKS HAVE BEEN ESTABLISHED, AND ARE NOW IN OPERATION.

County.	Cities and Towns in which Joint Stock Banks have been established.	Names of Banks.	Number of Banks.	Year in which they were established	Population of Cities and Towns, 1831.
Antrim,	Antrim,	Ulster Bank,	1	1836	2,655
	Belfast,	Agricultural and Commercial Bank,.	1	1836	53,287
		Bank of Ireland,	1	1825	
		Belfast Banking Company,	1	1827	
		Northern Bank,	1	1825	
		Provincial Bank,	1	1826	
		Ulster Bank,	1	1836	
	Ballymena,	Agricultural and Commercial Bank,	1	1836	4,067
		Belfast Bank,	1	1834	
		Northern Bank,	1	1834	
		Provincial Bank,	1	1833	
	Ballymoney,	Belfast Bank,	1	1834	2,222
		Ulster Bank,	1	1836	
	Carrickfergus,	Northern Bank,	1	1836	8,706
	Larne,	Belfast Bank,	1	1836	2,616
	Lisburn,	Northern Bank,	1	1835	5,218
Armagh,	Armagh,	Agricultural and Commercial Bank,	1	1836	9,189
		Bank of Ireland,	1	1827	
		Belfast Bank,	1	1835	
		Northern Bank,	1	1835	
		Provincial Bank,	1	1826	
		Ulster Bank,	1	1836	
	Lurgan,	Agricultural and Commercial Bank,	1	1836	2,842
		Belfast Bank,	1	1834	
		Northern Bank,	1	1834	
		Provincial Bank,	1	1834	
		Ulster Bank	1	1837	
	Portadown,	Belfast Bank,	1	1835	1,591
		Ulster Bank,	1	1836	
	Tanderagee,	Belfast Bank,	1	1835	1,559
Carlow,	Carlow,	Bank of Ireland,	1	1834	9,114
Cavan,	Cavan,	Agricultural and Commercial Bank,	1	1836	2,931
		Provincial Bank,	1	1834	
	Cootehill,	Provincial Bank,	1	1836	2,239
		Ulster Bank,	1	1837	
Clare,	Ennis,	Agricultural and Commercial Bank,	1	1834	7,711
		National Bank,	1	1836	
		Provincial Bank,	1	1835	
	Kilrush,	Agricultural and Commercial Bank,	1	1835	3,996
		National Bank,	1	1835	
Cork,	Bandon,	Agricultural and Commercial Bank,	1	1834	9,917
		Provincial Bank,	1	1834	
	Cork,	Agricultural and Commercial Bank,	1	1835	107,016
		Bank of Ireland,	1	1825	
		National Bank,	1	1835	
		Provincial Bank,	1	1825	
	Charleville,	National Bank,	1	1835	4,766
	Fermoy,	Agricultural and Commercial Bank,	1	1835	6,976
		National Bank,	1	1835	
	Kanturk,	Agricultural and Commercial Bank,	1	1835	1,349
		National Bank,	1	1835	
	Youghal,	Bank of Ireland,	1	1834	9,608
		Provincial Bank,	1	1831	
	Mallow,	Agricultural and Commercial Bank,	1	1835	5,229
		Provincial Bank,	1	1835	
	Mitchelstown,	National Bank,	1	1835	3,545
	Skibbereen,	Agricultural and Commercial Bank,	1	1835	1,835
Donegal,	Ballyshannon,	Provincial Bank,	1	1835	3,775
	Letterkenny,	Belfast Bank,	1	1835	2,168

County.	Cities and Towns in which Joint Stock Banks have been established.	Names of Banks.	Number of Banks.	Year in which they were established	Population of Cities and Towns, 1831.
Down,	Banbridge,	Provincial Bank,	1	1833	2,469
		Ulster Bank,	1	1836	
	Newry,	Bank of Ireland,	1	1825	13,065
	Downpatrick,	Northern Bank,	1	1834	4,784
		Provincial Bank,	1	1834	
		Ulster Bank,	1	1836	
	Newtownards,	Belfast Bank,	1	1836	4,442
Dublin,	Dublin,	Agricultural and Commercial Bank,	1	1834	232,362
		Bank of Ireland,	1	1783	
		Hibernian Joint Stock Bank,	1	1825	
		National Bank,	1	1835	
		Royal Bank of Ireland,	1	1836	
		Provincial Bank	1	1825	
Fermanagh,	Enniskillen,	Agricultural and Commercial Bank,	1	1836	6,056
		Provincial Bank,	1	1831	
		Ulster Bank,	1	1836	
Galway,	Ballinasloe,	Agricultural and Commercial Bank,	1	1836	4,140
		Bank of Ireland,	1	1836	
		National Bank,	1	1836	
	Galway,	Agricultural and Commercial Bank,	1	1835	33,120
		Bank of Ireland,	1	1830	
		National Bank,	1	1836	
		Provincial Bank,	1	1826	
	Loughrea,	National Bank,	1	1836	6,268
	Tuam,	Agricultural and Commercial Bank,	1	1835	3,111
		National Bank,	1	1836	
Kerry,	Cahirciveen,	National Bank,	1	1835	1,192
	Dingle,	Agricultural and Commercial Bank,	1	1836	4,327
	Killarney,	Agricultural and Commercial Bank,	1	1835	7,910
		National Bank,	1	1835	
	Tralee,	Agricultural and Commercial Bank,	1	1836	9,568
		Bank of Ireland,	1	1835	
		National Bank,	1	1835	
		Provincial Bank,	1	1828	
Kildare,	–	–	–	–	–
Kilkenny,	Kilkenny,	Agricultural and Commercial Bank,	1	1835	23,741
		Bank of Ireland,	1	1835	
		National Bank,	1	1836	
		Provincial Bank,	1	1827	
	Thomastown,	Agricultural and Commercial Bank,	1	1835	2,871
King's County,	Parsonstown,	Agricultural and Commercial Bank,	1	1836	6,594
		Provincial Bank,	1	1833	
	Tullamore,	Bank of Ireland,	1	1836	6,342
Leitrim,	–	–	–	–	–
Limerick,	Limerick,	Agricultural and Commercial Bank,	1	1835	66,554
		Bank of Ireland,	1	1827	
		National Bank,	1	1835	
		Provincial Bank,	1	1825	
	Rathkeale,	National Bank,	1	1835	4,972
Londonderry,	Coleraine,	Agricultural and Commercial Bank,	1	1836	5,752
		Belfast Bank,	1	1834	
		Northern Bank,	1	1834	
		Provincial Bank,	1	1827	
	Londonderry,	Agricultural and Commercial Bank,	1	1836	19,620
		Bank of Ireland,	1	1825	
		Belfast Bank,	1	1835	
		Northern Bank,	1	1835	
		Provincial Bank,	1	1825	
	Magherafelt,	Belfast Bank,	1	1835	1,436
		Northern Bank,	1	1835	
	Moneymore,	Provincial Bank,	1	1835	1,025
	Newtownlimavady,	Belfast Bank,	1	1835	2,428
		Northern Bank,	1	1835	
Longford,	Longford,	Agricultural and Commercial Bank,	1	1835	4,516
		Bank of Ireland,	1	1834	
		National Bank,	1	1836	
Louth,	Drogheda,	Bank of Ireland,	1	1834	17,365
	Dundalk,	Bank of Ireland,	1	1836	10,078

County.	Cities and Towns in which Joint Stock Banks have been established.	Names of Banks.	Number of Banks.	Year in which they were established	Population of Cities and Towns, 1831.
Mayo,	Ballina,	Agricultural and Commercial Bank,	1	1835	5,510
		National Bank,	1	1837	
		Provincial Bank,	1	1828	
	Castlebar,	Agricultural and Commercial Bank,	1	1835	6,373
		National Bank,	1	1836	
	Westport,	Bank of Ireland,	1	1825	4,448
		National Bank,	1	1837	
Meath,	–	–	–	–	–
Monaghan,	Clones,	Agricultural and Commercial Bank.	1	1836	2,381
	Monaghan,	Belfast Bank,	1	1835	3,848
		Provincial Bank,	1	1831	
Queen's County,	Mountmellick,	Bank of Ireland,	1	1836	4,577
Roscommon,	Boyle,	Agricultural and Commercial Bank,	1	1836	3,433
		National Bank,	1	1836	
	Castlerea,	National Bank,	1	1836	1,172
	Roscommon,	Agricultural and Commercial Bank,	1	1836	3,306
		National Bank,	1	1836	
	Strokestown,	Agricultural and Commercial Bank,	1	1835	1,547
Sligo,	Sligo,	Agricultural and Commercial Bank,	1	1835	15,152
		Bank of Ireland,	1	1828	
		National Bank,	1	1826	
		Provincial Bank,	1	1826	
Tipperary,	Carrick-on Suir,	National Bank,	1	1835	9,226
	Cashel,	National Bank,	1	1835	6,971
	Clonmel,	Bank of Ireland,	1	1825	15,134
		National Bank,	1	1835	
		Provincial Bank,	1	1825	
	Nenagh,	Agricultural and Commercial Bank,	1	1834	8,466
		National Bank,	1	1835	
	Roscrea,	Agricultural and Commercial Bank,	1	1835	5,512
		National Bank,	1	1835	
	Thurles,	Agricultural and Commercial Bank,	1	1836	7,084
		National Bank,	1	1835	
	Tipperary,	Agricultural and Commercial Bank,	1	1835	6,972
		National Bank,	1	1835	
Tyrone,	Cookstown,	Belfast Bank,	1	1835	2,883
	Dungannon,	Agricultural and Commercial Bank,	1	1836	3,515
		Belfast Bank,	1	1834	
		Provincial Bank,	1	1834	
	Omagh,	Agricultural and Commercial Bank,	1	1836	2,211
		Provincial Bank,	1	1834	
	Strabane,	Agricultural and Commercial Bank,	1	1835	4,700
		Belfast Bank,	1	1835	
		Provincial Bank,	1	1835	
Waterford,	Dungarvan,	National Bank,	1	1835	6,527
		Provincial Bank,	1	1835	
	Tallow,	National Bank,	1	1835	2,998
	Waterford,	Agricultural and Commercial Bank,	1	1836	28,821
		Bank of Ireland,	1	1825	
		National Bank,	1	1835	
		Provincial Bank,	1	1826	
Wexford,	Enniscorthy,	Agricultural and Commercial Bank,	1	1835	5,955
		National Bank,	1	1835	
	Ross,	Agricultural and Commercial Bank,	1	1835	5,011
		National Bank,	1	1835	
	Wexford,	Bank of Ireland,	1	1829	10,673
		National Bank,	1	1835	
		Provincial Bank,	1	1825	
Westmeath,	Athlone,	National Bank,	1	1836	11,406
		Provincial Bank,	1	1827	
	Moate,	National Bank,	1	1836	1,785
Wicklow,	–	–	–	–	–

SUMMARY of the FOREGOING TABLE.

	COUNTIES.	Agricultural Bank.	Belfast Bank.	Bank of Ireland.	Hibernian Joint Stock Bank.	Northern Bank.	National Bank.	Provincial Bank.	Royal Bank.	Ulster Bank.	Total.	Population of Counties, 1831.
LEINSTER.	Carlow,	0	0	1	0	0	0	0	0	0	1	81,988
	Dublin,	1	0	1	1	0	1	1	1	0	6	380,167
	Kildare,	0	0	0	0	0	0	0	0	0	0	108,424
	Kilkenny,	2	0	1	0	0	1	1	0	0	5	193,686
	King's County,	1	0	1	0	0	0	1	0	0	3	144,255
	Longford,	1	0	1	0	0	1	0	0	0	3	112,558
	Louth,	0	0	2	0	0	0	0	0	0	2	107,481
	Meath,	0	0	0	0	0	0	0	0	0	0	176,826
	Queen's County,	0	0	1	0	0	0	0	0	0	1	145,851
	Westmeath,	0	0	0	0	0	2	1	0	0	3	136,872
	Wexford,	2	0	1	0	0	3	1	0	0	7	182,713
	Wicklow,	0	0	0	0	0	0	0	0	0	0	121,557
MUNSTER.	Clare,	2	0	0	0	0	2	1	0	0	5	258,322
	Cork,	6	0	2	0	0	5	4	0	0	17	810,732
	Kerry,	3	0	1	0	0	3	1	0	0	8	263,126
	Limerick,	1	0	1	0	0	2	1	0	0	5	315,355
	Tipperary,	4	0	1	0	0	7	1	0	0	13	402,563
	Waterford,	1	0	1	0	0	3	2	0	0	7	177,054
ULSTER.	Antrim,	2	4	1	0	4	0	2	0	3	16	316,909
	Armagh,	2	4	1	0	2	0	2	0	3	14	220,134
	Cavan,	1	0	0	0	0	0	2	0	1	4	236,639
	Donegal,	0	1	0	0	0	0	1	0	0	2	289,149
	Down,	0	1	1	0	1	0	2	0	2	7	352,012
	Fermanagh,	1	0	0	0	0	0	1	0	1	3	149,763
	Londonderry,	2	4	1	0	4	0	3	0	0	14	222,012
	Monaghan,	1	1	0	0	0	0	1	0	0	3	195,536
	Tyrone,	3	3	0	0	0	0	3	0	0	9	304,468
CONNAUGHT.	Galway,	3	0	2	0	0	4	1	0	0	10	381,564
	Leitrim,	0	0	0	0	0	0	0	0	0	0	141,524
	Mayo,	2	0	1	0	0	3	1	0	0	7	366,328
	Roscommon,	3	0	0	0	0	3	0	0	0	6	249,613
	Sligo,	1	0	1	0	0	1	1	0	0	4	171,765

A RETURN showing the Average AMOUNT of the UNSTAMPED PROMISSORY NOTES on which COMPOSITION, in lieu of STAMP DUTY, has been paid by the several BANKING ESTABLISHMENTS in IRELAND, for the half year ended 31st December, 1837.

The Bank of Ireland, supposed to be - - -		£3,200,000
,, Provincial Bank of Ireland - - -		688,000
,, National Bank of Ireland - - -	£157,600	
,, Limerick do. - - -	66,300	
,, Clonmel do. - - -	70,600	
,, Carrick-on-Suir do. - - -	32,600	
,, Waterford do - - -	83,500	
,, Wexford and Enniscorthy, do. - - -	31,100	
,, Tipperary do - - -	79,800	
,, Tralee do - - -	28,700	
,, Cork do - - -	85,000	
,, Kilkenny do. - - -	28,100	
		£663,300
The Belfast Banking Company - - - -		167,400
,, Northern do. of Belfast . - -		136,600
,, Ulster do. of do. - - -		133,400
,, Agricultural and Commercial Bank of Ireland - -		18,300
,, Provident Bank of Ireland - - - -		6,000
Messrs. Ball & Co. of Dublin - - - -		16,500
	Total,	£5,029,500

AN ESTIMATE of the Proportions in which the total amount of BANKERS' NOTES in IRELAND circulate in each of the Four Provinces.

Assuming the amount of Notes circulated in Ireland to be £5,000,000	
The Province of Leinster may be considered to have . . .	£1,700,000
,, Ulster ,, . . .	1,400,000
,, Munster ,, . . .	1,300,000
,, Connaught ,, . . .	600,000
Total, .	£5,000,000

J. S. COOPER, Comp. Gen^{l}. of Stamps.

APPENDIX B. No. 17.

Appendix B.
No. 17.
Return of Steam Engines.

RETURN OF STEAM ENGINES EMPLOYED IN FACTORIES, &c. IN THE UNDERMENTIONED TOWNS.

Cities and Towns.	No. of Engines.	Date of Erection.	Horse Power.	For what Purpose Employed.
BELFAST, and its Neighbourhood,*	1	1806	20	Spinning Cotton Yarn
,,	1	1810	20	Foundry
,,	1	1810	32	Spinning Cotton Yarn
,,	1	1812	10	Making Paper
,,	1	1817	40	Making Whiskey
,,	1	1824	60	Spinning and Weaving Cotton
,,	1	1825	20	Grinding Wheat
,,	1	1825	40	Spinning Cotton Yarn
,,	1	1825	60	Spinning Linen Yarn
,,	1	1826	5	Foundry
,,	1	1826	15	Spinning Linen Yarn
,,	1	1827	16	Foundry
,,	1	1830	16	Cleansing the Docks
,,	1	1832	1½	Grinding Coffee
,,	1	1832	20	Spinning Linen Yarn
,,	1	1833	6	Grinding Bones for Manure
,,	1	1833	8	Making Starch
,,	1	1833	30	Spinning Linen Yarn
,,	1	1833	50	Ditto
,,	1	1834	16	Ditto
,,	1	1834	35	Ditto
,,	1	1834	100	Ditto
,,	1	1835	8	Making Lime
,,	1	1835	15	Bleaching and Dyeing
,,	1	1835	16	Spinning Linen Yarn
,,	1	1835	16	Ship-yard Foundry
,,	1	1835	40	Spinning Linen Yarn
,,	1	1835	40	Ditto
,,	1	1835	40	Grinding Wheat
,,	1	1835	60	Spinning Linen Yarn
,,	1	1836	4½	Making Sheet Lead, &c.
,,	1	1836	8	Machine Making
,,	1	1836	10	Foundry
,,	1	1836	16	Ditto
,,	1	1837	1	Grinding Drugs and Paints
,,	1	1837	3	Making Files
,,	1	1837	4	Making Stucco and Roman Cement
,,	1	1837	8	Making Chimney Pieces, &c.
,,	1	1837	18	Spinning Linen Yarn
,,	1	1838	40	Ditto
,,	1	—	10	Grinding Corn
,,	1	—	10	Calico Printing and Dyeing
,,	1	—	16	Grinding Wheat
,,	1	—	20	Spinning Linen Yarn
,,	1	—	30	Bleaching
,,	1	—	30	Calico Printing and Dyeing
,,	1	—	30	Spinning Linen Yarn
,,	1	—	40	Ditto
,,	1	—	60	Spinning Cotton and Linen Yarn
,,	1	—	60	Spinning Linen Yarn
Total, -	50	—	1,274	
CLONMEL, -	1	1829	10	Grinding Malt, Pumping Water, &c.
,,	1	1834	30	Making Flour
SUIR VILLE, within a mile of Clonmel, county Waterford,	1	1837	25	Making Flour
Total, -	3	—	65	
CORK,† - -	2	1815	32	Grinding Malt, Mashing, &c.
,,	2	1817	40	Ditto
,,	1	1818	12	Ditto
,,	2	1820	48	Ditto
,,	1	1820	12	Ditto
,,	1	1823	8	Glass Cutting
,,	1	1824	20	Making Cloth
,,	2	1825	40	Grinding Malt, Mashing, &c.
,,	1	1826	8	Ditto
,,	1	1828	12	Ditto
,,	1	1828	20	Grinding Flour
,,	2	1830	48	Grinding Malt, Mashing, &c.
,,	1	1830	12	Bleaching Linen
,,	1	1835	20	Grinding Malt, Mashing, &c.
,,	1	1837	20	Grinding Flour
,,	5	1810 to 1830	40	Foundries
,,	1	1830	8	Foundry
,,	1	1830	4	Ditto
,,	1	1834	8	Ditto
Total, -	28	—	412	

* Messrs. S. Boyd and Co., and Messrs. Coates and Young, are the principal Manufacturers of Steam Engines in Belfast.

† Engines usually made at the Manufactories of Messrs. Thompson, M'Sweeny, Perrott, and King, are from 10 to 20 horse power, for Mills and Distilleries.—There are no Steam Engines made by these Manufacturers for ships or boats.

Cities and Towns.	Number of Engines.	Date of Erection.	Horse Power.	For what Purpose Employed.
DUBLIN.* - -	1	1833	24	Pumping Coal Pits
,,	1	1833	12	Winding up Coal
,,	1	1834	10	Pumping Quarries
,,	1	1835	10	Working Hot and Cold Calenders
,,	1	1837	—	Pumping Mines, Wexford†
,,	1	1838	8	Working in shop for selves
,,	1	1811	45	Rolling Hoops, &c., Boring, Turning, &c.
,,	1	1812	4	Blowing Machine, and Turning Lathes
,,	1	1813	25	Distillery
,,	1	1815	25	Distillery
,,	1	1816	25	Distillery
,,	1	1816	8	Corn Mill
,,	1	1817	12	Distillery
,,	1	1817	10	Paper Mill
,,	1	1824	20	Distillery
,,	1	1825	6	Brewery
,,	1	1826	20	Corn Mill
,,	1	1827	16	Cotton Spinning Mill
,,	1	1828	20	Cotton Printing Works
,,	1	1828	8	Actuating Machinery
,,	1	1829	20	Distillery
,,	1	1831	16	Actuating Machinery
,,	1	1832	10	Pumping Water
,,	1	1834	16	Brewery and Corn Mill
,,	1	1834	10	Brewing, &c
,,	1	1833	10	Pumping Water
,,	1	1836	4	Gas Works
,,	1	1836	14	Corn Mill
,,	1	1837	30	Pumping Water (Colliery)
Total, -	29	—	438	
GALWAY, - -	1	1835	8	Keeping Basin dry
,,	1	1836	6	Foundry purposes
,,	1	1832	14	Driving Machinery
,,	1	1834	18	Distillery
Total, -	4	—	46	
KILKENNY,‡ -	1	1826	12	Distillery (not used)
,,	1	1838	10	Porter Brewery
,,	1	1827	60	Employed at the different Collieries
,,	1	1832	10	
,,	1	1832	36	
,,	1	1833	12	
,,	1	1838	24	
Total, -	7	—	164	
LIMERICK, - -	1	1818	10	Pumping in Distillery
,,	1	1818	16	Grinding Malt, Brewery
,,	1	1818	30	Ditto
,,	1	1818	30	Distillery
,,	1	1822	16	Grinding Malt, Brewery
,,	1	1830	8	Ditto
,,	1	1832	6	Grinding Paints, and Making Soda Water
,,	1	1828	36	Grinding Wheat and Dressing Flour
,,	1	1834	4	Grinding Malt in Brewery
,,	1	1836	20	Raising Water from the Shannon to a Reservoir
,,	1	1836	20	
,,	1	1838	10	Turning, &c. &c.
Total, -	12	—	206	
LONDONDERRY,	1	1815	10	Distillery
,,	1	1825	20	Corn Mill
,,	1	1834	10	Distillery
,,	1	1835	20	Corn Mill
,,	1	1836	20	Distillery
,,	1	1836	8	Metal Foundry
,,	1	1837	20	Spinning Mill
,,	1	1838	8	Foundry for Machinery
Total, -	8	—	116	
PORTLAW, -	3	—	300	Cotton Factory
WATERFORD, -	1	1817	10	Pumping and Grinding
,,	1	1823	6	Starch and Blue Manufactory
,,	1	1825	6	Glass Manufactory
,,	1	1828	8	Pumping and Grinding
,,	1	1832	6	Starch and Blue Manufactory
,,	1	1834	4	Blowing Furnaces
,,	1	1835	50	Grinding Wheat
Total, -	7	—	90	

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* Mr. Robinson has manufactured and erected sixteen stationary Steam Engines from 25 to 4 horse power; the whole of them are at work in various, Distilleries, Breweries, and Manufactories in this City and County. His rolling mill, foundry, smithy, and fitting up shops, are occasionally kept busy in supplying the Distilleries, Breweries, and Manufactories in this City, with hoops, metal, and wrought iron machinery. The yearly amount of his payments to work people averages £5,500.—Messrs Mallett have built new Engines amounting in all to 560 horse power, since the latter part of the year 1831.—In consequence of the increased demand for engineer work in general, Messrs. Courtney and Stephens have considerably enlarged their concerns in that department during the last year; and in a few months will be able to execute extensive orders. Since the opening of the Kingstown Railway, they have made most of the metal castings, also the engine and carriage wheels for the Company; and for this latter branch of Railway work they have just completed a set of furnaces capable of shoeing any sized wheel in use.—The Messrs. Courtney and Stephens, Robinson, Mallett, and Perry, are the principal manufacturers of Steam Engines in the City of Dublin.

† This is a 24-inch cylinder, double-acting, expansive engine.

‡ The river Nore running through the centre of this city and county, with the Barrow on the eastern side, and some small rivers in different parts of the county, afford such a supply of water as answers all the purposes of steam.

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FOR HER MAJESTY'S STATIONERY OFFICE.